



KANSAS 4-H

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# Poultry LEADER NOTEBOOK

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*Poultry Design Team:*

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(LN-5) 2nd Edition

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*This notebook is designed to help you as a 4-H poultry leader do the best job that you can to make the project a fun, interesting and valuable experience for the 4-H youth that you teach. The poultry project is one of several projects within the Animal Sciences 4-H Curriculum Division. The poultry project becomes the vehicle through which we can teach the youth who enroll. Other 4-H project areas such as meats, veterinary science, marketing, computer, health and safety are incorporated where appropriate.*

## OBJECTIVES

The objectives of the poultry project are as follows:

1. Learn and apply recommended principles of poultry production.
2. Demonstrate a knowledge of sound breeding, feeding and management practices.
3. Identify species, breeds of poultry and employ efficient marketing methods.
4. Develop integrity, sportsmanship, decision-making capability and public speaking skills through participation in demonstrations, tours, judging and/or exhibits.
5. Practice leadership skills and roles, take part in community affairs and demonstrate citizenship responsibility.
6. Explore career, job and productive leisure opportunities.
7. Develop skills, knowledge and attitudes for lifetime use.
8. Learn to use accepted practices for mental, physical and emotional health, and to respect yourself and others.



## MAJOR CONCEPTS

To help meet the above objectives, 11 general poultry project concepts or topics were identified by the Poultry Design Team. Each of the specific lesson plans falls under one of these major 11 concepts—Nutrition, Health Practices, Incubation and Breeding, Anatomy and Physiology, Selection and Culling, Nomenclature, Behavior, Management Practices, Reproduction and Genetics, Egg and Meat Marketing, and Business and Industry.

## LIFE SKILLS

Kansas 4-H life skills have been articulated to help define the youth development outcomes of our 4-H program. It is the goal of 4-H to develop youth who are contributing, productive



members of society. Youth may achieve this goal when these five life skills are developed and applied.

1. Positive self-concept
2. Sound decision-making
3. Positive interpersonal relationships
4. Desire for lifelong learning
5. Concern for community

These five life skills are incorporated throughout the lesson plans and in the educational design of the project meetings. The “Dialogue for Critical Thinking” Section leads the group through the experiential learning process.

## AGES AND STAGES

Leaders can best achieve these desired outcomes with their members when they have well-prepared leader material and understand how to structure a stimulating learning environment for the age of youth they are leading. We know and believe that each child is unique, yet we also know that there are generalities about certain age groups that help us program more effectively.

These lesson plans have been developed to target four general age groups:

- Level I—ages 7 and 8
- Level II—ages 9, 10, 11
- Level III—ages 12, 13, 14
- Level IV—ages 15 and older

A review about the physical, mental, social and emotional characteristics of these age groups will prepare the leader for a successful project experience. It should be understood by the leader that the levels are also based on corresponding skill levels of youth. Thus, a 12-year-old youth enrolling in the project for the first time should probably begin with lessons in Level I, and not take Level III until the member has mastered some basic knowledge and skills.

### **Ages 7 and 8**

Physical growth can be described as slow and steady. Mastering physical skills is important to self-concept. This includes everything from printing with a pencil to large muscle skills like catching a ball. Activities need to be just that—active! Provide opportunities to practice skills, but use projects that can be completed successfully and quickly by beginners.

Typical second or third graders think in concrete terms. If they have never seen it, heard it, felt it, tasted it, or smelled it, they have a hard time thinking of it. Leaders should

show and tell, rather than giving instructions verbally.

Early elementary children are learning to sort things into categories. This makes collecting things important and fun at this age. Most are more interested in the “process”—what? why? how?—than in the resulting product.

As children move away from dependence on parents at this age, they need to transfer that dependence to another adult, so the leader may become very important in their eyes. Building friendships occurs easily and generally by the end of this period, boys prefer playing with boys and girls with girls. Peer opinion now becomes very important. Small group activities are effective, but children still need an adult to share approval.

Seven and 8-year-olds need and seek the approval of adults, because they are not yet confident enough to set their own standards. Play or making believe is one way they increase their ability to imagine what other people think and feel. Rules and rituals are important, but it is very hard for children this age to lose. This is why success needs to be emphasized, even if it is small. Failures should be minimized. Cooperative games and activities are especially enjoyable. When an activity fails, the leader should help children interpret the reasons behind the failures, which teaches that failing is not bad. Learning to cope with problems is a skill the 4-H leader can encourage for all members. **The usual practice of awarding competitive ribbons should be minimized or avoided for this age.**



## **Ages 9, 10, 11**

Physically, most children at this age are in a holding pattern, although puberty may be starting for some very early-maturing girls. Activities should encourage physical involvement, because 9- to 11-year-olds are anything but still and quiet.

Hands-on involvement with objects is helpful. Children this age like field trips, but only if they are not expected to stay confined or to do one thing for a long period of time. Upper elementary children need opportunities to share their thoughts and reactions with others. They are still fairly concrete thinkers and will give more attention if they are seeing and doing things.

Children at this stage are beginning to think logically and symbolically and are beginning to understand abstract ideas. As they consider ideas, they think it is either right or wrong, great or disgusting, fun or boring. There is very little middle ground.

The role of the leader is most crucial at this stage, as these children look to the adult for approval and follow rules



primarily out of respect for the adult. Individual evaluation by adults is preferable to group competition where only one can be the best. They want to know how much they have improved and what they should do to be better next time. Encouragement from an adult can have remarkable accomplishments.

This is the age of the “joiners.” They like to be in organized groups of others similar to themselves. If you have both boys and girls of this age in your project groups, you will do best if small group work is done in same-sex groups. They generally are concerned with immediate self-reward; however, the satisfaction of completing a project comes from pleasing the leader or parent rather than from the value of the activity itself.

Toward the end of this age range, children are ready to take responsibility for their own actions. Giving these youth opportunities to make decisions should be encouraged. Leaders should move from dictating directions to giving reassurance and support for members’ decisions.

Nine, 10- and 11-year-olds have a strong need to feel accepted and worthwhile. School and other pressures become demanding. Successes should continue to be emphasized. Comparison with the success of others is difficult for these children. It erodes self-confidence. Instead of comparing children with each other, build positive self-concepts by comparing present to past performance for the individual.

### **Ages 12, 13 and 14**

This is a time of developmental variety among peers. Growth spurts beginning with adolescence occur at a wide range of ages, with girls maturing before boys. These rapid changes in physical appearance may make teens uncomfortable. Slower developing teens may also be uneasy about the lack of changes.

Young teens move from concrete to more abstract thinking. Playing with ideas is as much fun as playing sports. Ready-made solutions from adults often are rejected in favor of finding their own solutions. Leaders who provide supervision without interference will have a great influence on these youth.

Small groups provide the best opportunity for young teens to test ideas. Justice and equality become important issues. Judging of projects is now viewed in terms of what is fair, as well as a reflection of the self-worth of the individual.

These youth enjoy participating in activities away from home as they begin to develop independence. Opinions of peers become more important than opinions of parents or other adults. Close friendships begin to develop, and group experiences provide opportunity for social acceptance.

As puberty approaches, emotions begin a roller coaster ride. Young teens begin to test values and seek adults who are accepting and willing to talk about values and morals. This period seems to present the biggest challenge to a young person's self-concept. These youngsters face so many changes that they hardly know who they are. Adults can help by providing self-knowledge and self-discovery activities such as the "dialogue for critical thinking" portion of these lesson plans.

Continue to avoid comparing young people with each other, being careful not to embarrass them. They want to be a part of something important that provides opportunity to develop responsibility.

### **Ages 15, 16 and 17**

Most teens of this age know their own abilities and talents. In most cases, they have adjusted to the many body changes by now. Many develop athletic talent and devote hours to training and competition. Learning to drive a car further moves the teen from family into the community as independent people.

Mid-teens begin to think about their future and make realistic plans. Their vocational goals influence the activities they select. Teens set goals based on feelings of personal need and priorities. **Any goals set by others are generally rejected.** As they master abstract thinking, they can imagine new things in ways that sometimes challenge adults.

These teens can initiate and carry out their own tasks without supervision. A leader can be helpful by arranging new experiences in areas of interest to teens, but must be sure to allow for plenty of input from them. Leader-member relations should change from director/follower to that of advisor/independent worker.

Mid-teens tend to be wrapped up in themselves. Relationship skills are usually well-developed. Dating increases and acceptance by members of the opposite sex is now of high importance. Sports and clubs are important, but these teens now want to be recognized as unique individuals within that group.

Two important emotional goals of the middle-teen years are independence and identity. Time is precious. If activities are perceived as busywork, teens soon will lose patience and interest. Middle teens are learning to cooperate with others on an adult level. They will pride themselves on increased ability to be responsible in the eyes of themselves, peers, and adults.





## Ages 18 and 19

These young adults are completing their 4-H careers and moving on to college, jobs, marriage, and other adult responsibilities. If continuing involvement at the local level, they will be self-directed learners or assume adult leadership roles.

This information on child development has been taken from the North Central Regional Extension Publication No. 292, *Ages and Stages of Child and Youth Development: A Guide for 4-H Leaders*, written by Jeanne Karns, graduate assistant and Judith Myers-Walls, Extension Specialist, Human Development, Purdue University.

## YOUTH DEVELOPMENT

Some child development specialists and educators have noted every child of the '90s is vulnerable because of the complex social forces affecting our country since the early 1950s. In 1991, The National Commission on Children estimated that fully one-quarter of all children are “at severe risk” in relation to substance abuse, school failure, delinquency, etc., and another quarter are “moderately at risk.” H. Stephen Glenn and Jane Nelsen document these changes in their book, *Raising Self-Reliant Children in a Self-Indulgent World*. Four major factors necessary for the development of capable young people have been identified that are generally missing from our culture—networks, meaningful roles, on-the-job training, and parenting resources. 4-H project meetings can help restore these vital missing pieces.

Glenn’s definition of a network, in the simplest sense, defines the 4-H project meeting: “two or more individuals who engage in dialogue about the world and the life they are living and who occasionally collaborate to achieve some mutually desirable end.” The dialog for critical thinking portion of these lesson plans directly address this definition.

Many youth today are growing up in families and communities without any significant role to play. They just don’t seem needed until they become an adult. Research indicates that a primary cause of decline in motivation, discipline, and achievement is this perceived lack of need or value. Glenn and Nelsen challenge us to deal with youth actively in ways that affirm their contributions. **We must treat youth as contributors and assets rather than passive objects to be done for or to.** As 4-H project leaders, when we listen to members, we must take them seriously and treat them as significant, we will begin to restore the dialogue and collaboration necessary to link youth with the larger society.

On-the-job training with “hands-on” involvement has been the cornerstone of 4-H project work. It is important for youth to have this opportunity because that is where they learn patience, personal initiative, hard work and deferred gratification. If they don’t learn about real life in this way, they receive its impressions passively from the media, generally through five hours of television each day.

“Learning by doing” is one of the primary reasons why 4-H has been recognized in the field of informal education. If we, as parents or leaders, think we are helping when we do their work for them, we need to stop and consider that, “The best way to destroy self-esteem and a sense of worth in young people is to do too much for them. This robs them of a sense of personal capability. The greatest gift of all is to help them validate themselves as agents in their own lives.” (Glenn and Nelsen, pg. 47)

Today’s parents need all the help they can get. According to the Ewing Marion Kauffman Foundation report, *Reweaving the Tattered Web—Socializing and Enculturating our Children*, by Basil J. Whiting in June 1993, “Three generations and extended families in the same house are not so common. Grandparents and aunts and uncles live longer distances away, and often alone (only five percent of American children now see a grandparent regularly)... Divorce is common. Half of those who remarry will experience a second divorce. Half of all children will spend some of their childhood with a divorced parent.” As a 4-H project leader, you become a parent resource, both to the child and the child’s parent.

Today’s parents are concerned and fearful for their children. Why? Dr. Bruce Baldwin, nationally known psychologist and author says, “They wonder if their kids have what it takes to succeed as they have. Parents know that in the future, even menial positions will require well-developed cognitive skills: reading, writing, math, computer literacy, and the ability to process information quickly and efficiently.” (*TEAM, The Early Adolescence Magazine*, Vol. IV, No. 5, May-June 1990)



The same magazine noted that a large metropolitan education trust reported the types of requirements for employees comparing the past with the future:

PAST

Doers  
Single repetitive functions  
Individual piecework  
Autocratic  
Single job in lifetime  
Familiar with simple machines  
Single task orientation

FUTURE

Thinkers  
Quality circle approach  
Team centered  
Participatory  
Flexible learners  
Technology knowledgeable  
Information processors

The January 1990 issue of *Prevention Forum* magazine offers hope for today’s youth when it reports that research on youth who have become healthy adults in spite of adversity have had the opportunity, somewhere in their lives, to experience a caring, nurturing environment that



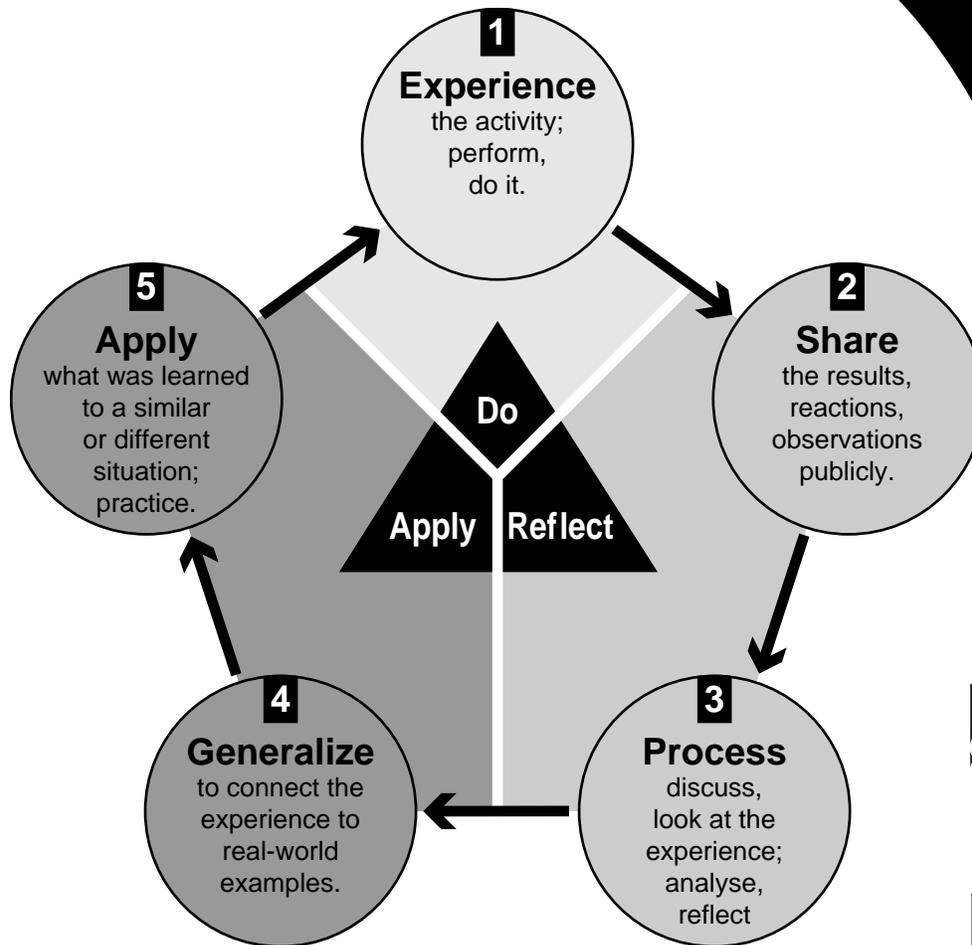
encourages their active participation in problem-solving, decision-making, planning, goal-setting, and helping others in meaningful activities.

According to the Kauffman Foundation report, “child and youth development by natural osmosis is no longer an effective strategy. We can rely no longer on child development to occur as a natural by-product of family and community functioning because too many families and communities no longer function the way they used to.

This means reweaving the web to do what the family and community no longer do, and perhaps no longer can do adequately. It means constructing new institutions and new ways for children and youth to sustain relationships with a variety of caring adults.... Yet this must be supplementation, not replacement. We dare not leave out strands of parent-strengthening services in the many ways and places where traditional parenting is, at bottom, the still-to-be-preferred approach.”

The project lesson plans contained in this leader’s notebook have been designed to incorporate the components critical to the development of capable, contributing young people. By following these plans, leaders will help prepare their members to function and live productively in the world which they will soon inherit and direct. They are also designed to help you, as the leader, quickly and easily prepare for the lesson, conduct the activity, and facilitate the discussion and dialogue.

# EXPERIENTIAL LEARNING MODEL



## Example questions used to complete the Experiential Learning Model

### A. Share (*what happened*)

1. What did you do?
2. What happened? What did you see? Hear? Touch? Taste?
3. How did you feel?
4. How did it feel to...?
5. What was most difficult? Easiest?

### B. Process (*what's important*)

1. What problems or issues seemed to occur over and over?
2. What similar experiences have you had?
3. What was most important?
4. Why was that significant?
5. Why do you think it happened?
6. What caused you to feel that way?

### C. Generalize (*so what?*)

1. What did you learn about yourself through this activity?
2. What did you learn about a life skill?

3. How do the major themes or ideas relate to real life and not just the activity?
4. How did you go about making your decision?

### D. Apply (*now what*)

1. How can you apply what you learned (life skill) to a new situation?
2. How will the issues raised by this activity be useful in the future?
3. How will you act differently in the future as a result of this activity?
4. How can you do it differently for different results?



## APPLYING THE EXPERIENTIAL LEARNING PROCESS

Hands-on involvement (learning by doing) is the most effective method for learning this material. It helps youth learn personal initiative, hard work, patience and deferred gratification. By doing the work for the youth, parents, teachers and leaders may destroy the young person's self-esteem and sense of worth. They may rob youth of learning by trial and error, practicing skills and becoming competent and capable. The greatest gift leaders can give is to help youth validate themselves as capable people. These lessons were designed using a model known as the *experiential learning process* which was adopted as the national curriculum development model for Extension Youth Development in 1992.

Experiential learning takes place when a person is involved in an activity, looks back and evaluates it, determines what was useful or important to remember, and uses this information to perform another activity.

The Experiential Learning process encourages youth involvement through dialogue and strengthens adult-child relationships. To enhance the goal of learning an atmosphere of friendliness, trust, and unconditional acceptance is required.

In each lesson, the “Dialogue for Critical Thinking” questions help complete the experiential learning steps. Except for the content review questions, most of these leading questions do not have a “right” or “wrong” answer. In addition to providing feedback to the leader, their purpose is to affirm and validate the perceptions of the members.

Take time to begin to feel comfortable with this process. It may seem awkward at first, but remember, Latin for “to teach” means to draw forth through dialogue and understanding. When the Experiential Learning process is used to help youth share the process of discovery, leaders will be developing them as critical thinkers, concerned for others, with the wisdom to function successfully in their future world.

## FORMAT OF EACH LESSON PLAN

Each lesson plan in this notebook follows the same general outline which includes:

**TITLE**—generally descriptive of the skill to be learned.

**LEVEL**—describes which age level it is written for.

What Members Will Learn...

**ABOUT THE PROJECT**—indicates what subject matter will be learned.

**ABOUT THEMSELVES**—indicates what personal or life skills will be learned. These specific objectives can be used to evaluate if the lesson was successful and learning goals accomplished by the members.

**MATERIALS NEEDED**—tells the leader what equipment, supplies, visuals or handouts will be needed in preparation for the lesson.

**ACTIVITY TIME NEEDED**—gives the approximate time needed to complete the activity. Most lessons can be completed in 30 to 60 minutes.

**ACTIVITY**—information is what the leader needs to know to teach the activity. This portion can be used as a leader’s script for the leader if necessary.

**LEADER NOTES**—give directions or instructions for the leader which go with the “Activity” information. Space is available for leaders to write their own notes also. Member activity sheets or handouts are provided for the leader to copy and give to members to work on at the meeting or take home so parents can reinforce the learning.

**DIALOGUE FOR CRITICAL THINKING**—questions are provided for the leader to help enhance life skill development and generalize the subject information to the real world of the youth participant.

**GOING FURTHER**—ideas such as tours, demonstrations, handouts, and things to do at home, are for the leader and members to consider if they want to learn more about this particular lesson content.

**REFERENCES**—credit the source used to develop this lesson activity in addition to the author.

**AUTHOR**—is the source of information plus names of Kansas State University faculty who reviewed and adapted this lesson including specific ideas from volunteers.

The Poultry project is one of several Kansas 4-H projects to undergo a major change in the way the project materials have been designed and used. Leaders need to realize that members will no longer receive member resource books or materials through the K-State Research and Extension office. Members will receive a “Member





Guide and Annual Report” which outlines how to set learning goals, describes learning opportunities, describes the recognition system, suggests where they can find more information, and provides a year-end Poultry summary record. All other printed materials for members will be given to them by their project leader.

In order for members to have a successful project experience, it is **imperative** that a leader meet with members. These lessons work best with an adult and/or teen leader working with a small group of members. Several youth in the group will stimulate the discussion and dialogue, which is so important to the success of this process. If members are unable to meet in a group, the parent may serve as a leader to his/her child by requesting copies of the appropriate lesson plans from the K-State Research and Extension office and completing them at home.

The project has been restructured to feature a series of sequential learning experiences based on members’ age and skill level, which will challenge them with new skills each year they remain in the project. Our goal is to make them knowledgeable of the entire industry rather than specialize in one type of project exhibit. In fact, owning a bird and exhibiting at a show need not be required. It is possible for a member to participate in many group lessons without owning a bird. Owning, caring for and exhibiting a bird should be considered a special bonus to the total project experience.

The project exhibit should be decided by the member, parent and leader, based on member’s age, skill level, facility and financial needs, and what local exhibit opportunities have been identified. Most counties provide county fair classes for individual birds of standard breeds, production and meat pens, waterfowl and pigeons. This approach to the poultry materials provides maximum flexibility for counties to establish exhibits that meet the needs of their poultry members. Poultry shows should be encouraged to offer other exhibit opportunities (educational posters, talks, demonstrations, window displays, etc.) in addition to actual bird exhibits.

Ideally, members should progress through all levels in order, but it is not necessary. If project members vary in age and skill levels and the group is large enough, splitting into like age groups with additional leaders is recommended. Older members might be used as assistant leaders with beginning levels which then allows teens to be self-directed learners for advanced skills, or teens might meet together as a multi-club or county-wide group.

# ROLE OF THE 4-H PROJECT LEADER

Your major roles are that of teacher, facilitator and encourager.

## **Your Role as Teacher:**

- Help members set goals.
- Share your knowledge of the project through meetings, tours and home visits. Having five to 10 meetings works well. Set meeting dates and times with the participants. Remind participants of upcoming meetings.
- Invite and involve parents and other leaders when appropriate.
- Keep your skills current through trainings, consultations, and reading. Ask for help or advice as needed.

## **Your Role as Facilitator:**

- Use techniques to facilitate (assist) learning. See “Teaching With Discussion.”
- Be sensitive and respond to individuals’ needs, beliefs and family circumstances. Do not judge.
- Help members find additional learning opportunities and resources. (Using “Going Further” in the lessons.)
- Relate project to everyday life and career possibilities.



## **Your Role as Encourager:**

- Recognize the personal growth of members and help them celebrate their successes.
- Lead (not push) participants into new skills and new ways of thinking. Encourage and challenge them to become better persons, yet always accept them and love them as they are now.

Your classroom is wherever the member must be in order to learn—in the home, meeting room, or on a field trip. Your subject matter, what you teach, is Poultry plus youth development.



# TEACHING WITH DISCUSSION

## Why Use Discussion?

Discussion is part of every lesson. Discussion questions appear in the “Dialogue for Critical Thinking” section. Discussion is most effective when you want to:

1. Give participants practice thinking in terms of the subject matter.
2. Help participants evaluate their beliefs.
3. Stimulate participants to apply principles.
4. Help participants learn to anticipate or solve problems.
5. Use the resources of the group members.
6. Gain acceptance of new information.
7. Develop motivation for further learning.
8. Get feedback on how well participants learned the material.

## How Can I Get People to Talk?

Discussion can be difficult at first simply because few participate. Sometimes, all that is necessary to improve the situation is time, your smiles and encouragement, and practice. Many participants are used to being talked **at**, not **with** in educational situations. The fear of being embarrassed is another major factor. Not knowing the other participants, being unsure of one’s idea, being afraid of sounding silly—these make participants feel that the safest thing to do is remain silent.

## How Can I Help Them Overcome Their Fear?

The first step is making sure participants become acquainted with each other and with you. Begin by having get-acquainted activities at the organizational meeting. Continue by providing games, refreshments, time to talk, and other opportunities for friendship building throughout the project meeting period. Get to know each participant personally. Take a special interest in them; they will come to trust you.

When asking a question, call on participants by name. This seems to promote freer communication.

Sitting in a circle encourages exchange.

Eliminate the fear of being wrong. (This is a tremendous barrier to discussion.) Avoid questions where there is only one right answer. Do not judge participants’ answers about beliefs and preferences. Do not allow any participant to make unkind comments about another’s answer.

At times, give participants opportunities to talk in small groups to work out answers together. If your group seems to have difficulty responding to questions, allow them to write out their answers first. This seems to give them added confidence to share their thoughts

with others. As much as possible, ask questions that can have no wrong answers: How do you feel about this? What do you think?

### **What if Someone Talks Too Much?**

There are several effective ways to work with a person who monopolizes the discussion. You might ask this person and at least one other to observe the discussion and report their observations to the group; for example: Did we solve the problem? Did everyone get a chance to participate? Another option is to divide into smaller discussion groups. Ask one person from each group to report the results of the discussion. Do not choose the monopolizer to report. You also could talk to this person privately. Explain that you appreciate the participation and insights, but you believe other people also should be given the opportunity to learn how to talk in a group. Ask this participant to help the group by allowing others more time for discussion and perhaps saving personal insights for more difficult questions.

Reference: *Teaching Tips* by Wilbert J. McKeachie (1986)

## **THE FIRST MEETING**

The first meeting is usually an organizational one to plan for the project year. It is a good idea to have parents attend this first meeting with the members. Parents should be encouraged to take part in any or all activities.

As members arrive, plan something for them to do. Perhaps a teen leader can be prepared with a get-acquainted game or activity. Make sure every member knows everyone else. Do not assume this is the case. Taking time now to build group trust will have payoffs later in commitment, discipline and encouraging discussion. Share some of the broad objectives you have for the project. Set dates with members and parents for future meetings. Schedule any demonstrations with members and discuss other special activities for the entire year. Discuss your expectations for recovering costs of materials, copying, etc.

Young people deserve to be treated as contributors and assets instead of passive objects to be done for or to. Your job is to involve your participants and challenge them toward learning and personal growth. They should be involved in the planning and preparation of meetings. A map helps to give us direction, keep us on track and know when we've reached our destination. We've designed a MAP—Member Achievement Plan—to help you and your members plan, as a group and as individuals, what they want to learn, make and do in this project. This is called goal-setting. It also teaches decision making.





### ■ MAP STEP 1

At the project meeting, or at home with their family, members identify two things they would like to learn in their Poultry project this year.

### ■ MAP STEP 2

List three to five steps that will help you complete your first goal.

### ■ MAP STEP 3

List a date or deadline that shows when you plan to complete each step toward your goal.

### ■ MAP STEP 4

As you complete a step or meet a deadline, give yourself a boost, energizer or reinforcer for your success. List one energizer for each step accomplished toward a goal.

### ■ MAP STEP 5

After finishing a step, record the “date completed.”

### ■ MAP STEP 6

Repeat Map Steps 2 through 5 for your second goal.

### ■ MAP STEP 7

Share with a project friend what you have planned. Talking helps generate new ideas to improve your plans. After explaining your goals ask your friend to sign your plan as well as your leader. This will help confirm your plans and be a source for assistance.

### ■ MAP STEP 8

Take notes in the journal to help remember your project experiences. Tell what you did, what you learned, and how you felt about each project activity (meeting, trip, demo, etc.). Note: Leader may want to keep journals and plan for each member to make an entry as part of each activity. Journals may be kept on a computer, calendar, notebook, diary or other convenient form.

### ■ MAP STEP 9

At the end of the year take time to reflect with your project friend and leader. Record your thoughts and ideas. How did the goals work? What was learned? What needs to be accomplished next? Members may not have accomplished what they set out to do, but they may have learned many things in the process. Setting a goal to reach a partial number of total goals isn't a bad idea, since it enables the younger member to feel successful.

The member and the leader, or in the case of the parent leader, the member and the parent, should complete Step 7 of the MAP as soon as the member has completed his/her short-term plans. All members who complete this step should be given immediate recognition

for their project goal-planning accomplishments. The Kansas Recognition Model provides for recognition for: participation, progress toward goals, standards of excellence, peer competition and team cooperation efforts.

When properly used, incentives can be an effective way to encourage good project work and enhance personal development of the members. One of the strongest human incentives is that inner feeling of accomplishment and achievement.

Public recognition in news articles or at meetings, a word of encouragement or pat on the back from leaders are also effective in promoting desirable performance.

Group recognition should be used at the end of the project to recognize the accomplishments of each member who completed the project, attended a certain number of meetings, demonstrated certain acquired skills, etc. Recognize not only the member who might have won the championship, but use your imagination to recognize the most improved showperson, best caretaker, best records, most improved poultry judge, etc.

## REFERENCES

Portions of this introduction section have been adapted from the *Beef Cattle Leader Guide* published by the Texas Agricultural Extension Service, and from *Celebration!*, Nebraska Cooperative Extension Service, 4-H publication 262.

*Reweaving the Tattered Web—Socializing and Enculturating our Children*, by Basil J. Whiting, is published by Ewing Marion Kauffman Foundation, 4900 Oak, Kansas City, MO 64112-2776.

*Raising Self-Reliant Children in a Self-Indulgent World*, by H. Stephen Glenn and Jane Nelsen, Ed. D., is published by Prima Publishing and Communications, P.O. Box 1260SR, Rocklin, CA 95677, (916) 624-5718, and can be ordered from St. Martin's Press, 175 Fifth Avenue, New York, NY 10010 (212) 674-5151.

A video presentation by Stephen Glenn, which summarizes much of *Raising Self-Reliant Children in a Self-Indulgent World*, can be requested through your local K-State Research and Extension office. Ask for the video, Developing Capable Young People, available from Kansas State University, Department of Communications, Production Services/Instructional Media.





## PLANNING HELPS

The following forms may be used by the leader to help in planning for their Poultry project experience.

- Project Member Enrollment Record
- Project Leader Meeting Record
- List of Members and Their Goals
- Volunteer Support Form
- Project Meeting Checklist

## OTHER POULTRY RESOURCES

The following materials are available from either your local Research and Extension office or from the State Extension Poultry Specialist. The code behind each resource indicates the source; (C) = County Office and (S) = State Specialist's Office. The slide sets and films are available on a reservation basis.

1. *A Guide in Selecting and Preparing Birds for Show*—K-State Research & Extension, L-771 (C)
2. *Artificial Insemination of Poultry*—NCR Extension Publication #216(S)
3. *Avian Influenza Prevention in Gamebird and Ratite Facilities*—K-State Research & Extension, MF-2114 (C)
4. *Barbecuing Chicken*—K-State Research & Extension, L-249 (C)
5. *Breeds and Varieties of Poultry* —K-State Research & Extension Slide Series (S)
6. *Capon Production*—NCR Extension Publication #186 (C)
7. *Controlling Cannibalism in Poultry*—K-State Research & Extension, L-177 (C)
8. *Culling Egg Production in Chickens*—K-State Research & Extension Mimeo (C)
9. *Development of the Chicken Embryo*—California Extension Slide Series (S)
10. *Feeding the Small Flock of Poultry*—K-State Research & Extension, C-392 (Revised) (C)
11. *Formation of the Egg*—Kansas State University Video (S)
12. *Grading Eggs*—USDA Slide Set (S)
13. *Grading Poultry*—USDA Slide Set (S)
14. *Healthy Flocks-Healthy Families*—University of Tennessee Slide/Tape Set (S)
15. *Home Processing of Poultry*—K-State Research & Extension, L-769 (C)
16. *Is Poultry Production for You*—MF-824 (Revised) (C)
17. *Judging Poultry at the County Fair*—L-772 (C)
18. *Leg Disorders in Broilers and Turkeys*—K-State Research & Extension, L-767 (C)
19. *Management of the Small Flock of Chickens*—K-State Research & Extension, C-507 (C)
20. *National Poultry Judging Manual*—S 71
21. *Ostrich Production*—K-State Research & Extension, L-799 (C)





22. *Poultry Handbook*—\$20 from Animal Sciences and Industry Department, Call Hall, Manhattan, Kansas 66506-1600 (S)
23. *Poultry Houses*—USDA Miscellaneous Publications #1403 (C)
24. *Prevention and Control of Poultry Diseases*—K-State Research & Extension, L-754 (C)
25. *Raising Broilers for Food and Show*—K-State Research & Extension, L-768 (C)
26. *Raising Ducks*—L-500 (Revised) (C)
27. *Raising Geese*—L-501 (C)
28. *Raising Pigeons*—K-State Research & Extension, MF-987 (C)
29. *Safe and Wholesome Poultry through Residue Avoidance on the Farm*—USDA Slide Set (S)
30. *Suggested Treatments for Diseases and Internal Parasites of Poultry*—K-State Research & Extension, L-765 (C)
31. *Try Pickling Eggs at Home*—K-State Research & Extension, L-298 (C)

### Reference Books

1. *The Bantam Standard*—American Bantam Association, Box 610, N. Amherst, Massachusetts 01002
2. *The Standard of Perfection*—American Poultry Association, 26363 S. Tucker Rd., Eftacada, Oregon 97023—Cost \$37

### Periodicals

1. *American Pigeon Journal* (all breeds)—Warrenton, Missouri 63383
2. *Broiler Industry* (commercial broiler production)—Watt Publishing Company, Sandstone Bldg., Mt. Morris, Illinois 61054
3. *Game Breeders Gazette* (game breeders and exotic bird fanciers)—1155 E. 4780 South SS, Salt Lake City, Utah 84117
4. *Hen House Herald* (newspaper promoting exhibition poultry)—Box 1647, Easley, South Carolina 29641
5. *Poultry Digest* (concise articles on egg and meat chickens)—Watt Publishing Company, Sandstone Bldg., Mt. Morris, Illinois 61054
6. *Poultry Times* (weekly newspaper for commercial poultry producers)—Box 1338, 245 Green St. NW, Gainesville, Georgia 30501
7. *Poultry Tribune* (commercial egg production)—Watt Publishing Company, Sandstone Bldg., Mt. Morris, Illinois 61054
8. *Turkey World* (commercial turkey production)—Watt Publishing Company, Sandstone Bldg., Mt. Morris, Illinois 61054
9. *Egg Industry* (commercial production)—Watt Publishing Company, Sandstone Bldg., Mt. Morris, Illinois 61054



# PROJECT LEADER MEETING RECORD

Name of Project		Phase(s)								Project Leader	
Project Members		Attendance at Project Meetings								Presentations Made by Members	
Name	Phone	1	2	3	4	5	6	7	8	Demonstrations	Talks
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											
16.											
17.											
18.											
19.											
20.											

# LIST OF MEMBERS AND THEIR GOALS

1. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

2. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

3. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

4. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

5. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

6. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

7. **Name** \_\_\_\_\_

Plans or wants to do: \_\_\_\_\_

Assistance, resources, or materials needed: \_\_\_\_\_

# VOLUNTEER SUPPORT FORM

Volunteer I name \_\_\_\_\_

Volunteer II name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Home phone \_\_\_\_\_

Volunteer I Occupation \_\_\_\_\_ Business phone \_\_\_\_\_

Volunteer II Occupation \_\_\_\_\_ Business phone \_\_\_\_\_

Other Volunteer obligations \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## I would be willing to assist the 4-H program by:

**Volunteer I**

**Volunteer II**

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Helping members with demonstrations.                             |
| <input type="checkbox"/> | <input type="checkbox"/> | Helping members with project talks or public speaking.           |
| <input type="checkbox"/> | <input type="checkbox"/> | Helping provide transportation to project meetings.              |
| <input type="checkbox"/> | <input type="checkbox"/> | Assisting members with project records.                          |
| <input type="checkbox"/> | <input type="checkbox"/> | Helping provide transportation for project tours or field trips. |
| <input type="checkbox"/> | <input type="checkbox"/> | Assisting with project meetings when needed.                     |
|                          |                          | Special skills I have _____ .                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Help bring refreshments.   |
| <input type="checkbox"/> | <input type="checkbox"/> | Develop a "calling tree" for meeting reminders.                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Making my home available for a project meeting if needed.        |
| <input type="checkbox"/> | <input type="checkbox"/> | Helping provide special supplies if needed.                      |
| <input type="checkbox"/> | <input type="checkbox"/> | Others, please explain: _____                                    |
|                          |                          | _____  |
|                          |                          | _____  |

# PROJECT MEETING CHECKLIST

## *A Meeting Evaluation Instrument*

After your project meeting, take a few minutes to consider each of the following questions. This checklist should also serve as a reminder of ideas to incorporate in future project meetings.

	Meetings Held					
	1st	2nd	3rd	4th	5th	6th
1. Were the objectives of the meeting clear to members?						
2. Did I give each member a chance to actively participate? (sharing ideas, assisting, presentations)						
3. Did I commend or encourage each youth in some way?						
4. Did I plan for differences in ages, abilities, and interests of members?						
5. Did I observe progress of individual members:						
6. Did I involve other volunteers in some way? (planning, leadership assistance, transportation, refreshments)						
7. Did I give members a chance to assume responsibility when it was appropriate?						
8. Did I incorporate some fun activity or game into the project meeting?						
9. Did I summarize the new information shared and skills learned at the close of the meeting?						
10. Most of all, did I enjoy working with the young people involved?						

*\*Seven or more positive responses denotes an excellent meeting rating!*





# POULTRY MEMBER GUIDE AND ANNUAL REPORT

Welcome to the 4-H Poultry Project! The purpose of this Poultry Member Guide and Annual Report is to help you journey through your Poultry Project. This guide will:

- Identify how to set goals on things to learn and begin your project,
- Identify 4-H learning opportunities,
- Identify 4-H recognition system,
- Provide you with an annual summary for your Kansas 4-H Poultry Project.

## EXAMPLES OF GOALS ON THINGS TO LEARN

- Level I - Identify five poultry breeds
- Level II - The parts of an egg
- Level III - How to raise day-old chicks
- Level IV - Stages of chick embryo development
- How to catch and handle a bird
- Effect of light on egg production
- Types of feathers and their functions
- The potential of five poultry careers

In addition, there is a note to your parents/guardian at the bottom of this page, so they can help you with your poultry project.

## LEARNING OPPORTUNITIES IN 4-H

- Attending project meetings with your friends
- Learning record-keeping skills
- Giving presentations at club and county 4-H Days, State Fair, school or civic groups
- Attending judging clinics and contests to observe, evaluate and make decisions
- Exhibiting at local, county, state or at American Poultry Association sanctioned shows

## 4-H RECOGNITION SYSTEM

4-H's Recognition System is diverse and provides you with many learning opportunities:

- Participation: attending project meetings, helping others at project meetings, show and share at State Fair
- Progress toward goals: meeting the deadlines you set on your MAP sheet (see page 2)
- Standards of excellence: meeting a high percentage of learning goals for each level of the project
- Peer competition: judging and showmanship contests at poultry shows and fairs
- Team/cooperative efforts: community service activities

## NOTES TO PARENTS/GUARDIANS:

The Poultry Project is one of several projects in the Animal Sciences Division of Kansas 4-H projects. It is an ideal project for both rural and urban youth, as well as all age groups. Poultry is a good beginning project because it requires minimal investment and teaches responsibility.

If your youth does not have a group leader, check with your local K-State Research and Extension office to see if your youth can participate in a neighboring club. If this is not available, you will need to act as the leader or helper. The K-State Research and Extension office has a copy of the "Poultry Leader's Notebook" you may wish to use.

Insert all member handouts and activity sheets in the 4-H Record Book after this Poultry Member Guide and Annual Report. These records are a recording of what was done. List costs, hours spent, etc., on your journal page created in MAP STEP 8. Financial and performance records may be found in: Level II pages 65 to 70; Level III pages 21 to 26, 33 to 42, 53 to 60 and 74 to 84. Using records before the youth is capable of understanding the concept or doing the math computations is strongly discouraged!

## HOW TO SET GOALS AND BEGIN YOUR PROJECT USING THE MEMBER ACHIEVEMENT PLAN—MAP

This is your **Member Achievement Plan—MAP**. This plan will help you begin to decide what goals, deadlines and energizers you want to use for the upcoming year.

### MAP STEP 1

Identify as goals two things you would like to learn this year. Your leader will give you a list that might help you think about what you want to learn in your poultry project.

Goal 1: \_\_\_\_\_

Goal 2: \_\_\_\_\_

### MAP STEP 2

After you identify each goal, let's break them into steps. You can list 3 to 5 steps for each one of your goals.

Steps for Goal 1:	MAP STEP 3 Deadline	MAP STEP 4 Energizer	MAP STEP 5 Date Completed
1st _____	_____	_____	_____
2nd _____	_____	_____	_____
3rd _____	_____	_____	_____
4th _____	_____	_____	_____
5th _____	_____	_____	_____

### MAP STEP 3

Now that you've put Goal 1 into steps, go back and put a deadline next to each step. The deadline shows when you plan to complete the step. Every step should have a different deadline or date.

### MAP STEP 4

Sometimes goals are hard to stick to. It takes a long time to see results. So as you complete a step and meet a deadline you need to give yourself a boost. Let's call this boost an energizer or reinforcer. An energizer can be anything that you like and enjoy: going to a movie with a friend, talking on the phone, listening to a CD, taking your dog for a walk, eating a healthy snack, playing ball, etc.

What are other things you might use as energizers? List them here: \_\_\_\_\_

---

Now, place one energizer for each step under the column marked, "Energizer."

### MAP STEP 5

When you've finished a step in your goal, place the date completed in the column marked, "Date Completed."

## MAP STEP 6

Now that you've identified your steps, deadlines and energizers, do the same for Goal 2.

Steps for Goal 2:	MAP STEP 3 Deadline	MAP STEP 4 Energizer	MAP STEP 5 Date Completed
1st _____	_____	_____	_____
2nd _____	_____	_____	_____
3rd _____	_____	_____	_____
4th _____	_____	_____	_____
5th _____	_____	_____	_____

## MAP STEP 7

Your goals, steps, deadlines and energizers are written. It's time to share with one of your project members. When we talk to others about our goals, it helps us get a better idea of what we are going to do. Sometimes talking will help us get a better idea, so don't worry about changing any part of your MAP if you want to. After you've explained your goal to a project friend, have them sign and date it in the space provided below.

Project Friend's Signature \_\_\_\_\_ Date \_\_\_\_\_

Have your project leader sign below:

Project Leader's Signature \_\_\_\_\_ Date \_\_\_\_\_

## MAP STEP 8

Keep a journal of everything you do in the project to help you remember these experiences. (Create a page with these headings and add it to this record.)

Date	What you did, learned, how you felt, costs, time spent, etc.
Ex. Nov 5	Attended a project meeting and learned parts of a bird. Now I know why a bird can fly so easily.
Mar. 6	Spent 10 hours building an incubator at a cost of \$25.

## MAP STEP 9

You've spent a whole year on your poultry project. You should have learned many new things. Take some time to think back and review your journal (STEP 8). Write one or two main things you have learned about poultry. What is something you have learned about yourself while studying poultry? (Add a page if you need more space.)

Year \_\_\_\_\_  
**Kansas 4-H Poultry Summary**

Name of project \_\_\_\_\_ Type of bird to exhibit \_\_\_\_\_  
 Name \_\_\_\_\_ Age \_\_\_\_\_ Years in 4-H \_\_\_\_\_  
 4-H Club \_\_\_\_\_ County \_\_\_\_\_

1. Breed(s) \_\_\_\_\_
2. Date project started \_\_\_\_\_ 3. Date project ended \_\_\_\_\_
4. Total value or money received (column 2) \_\_\_\_\_ \$
5. Value of birds at beginning (column 1) \_\_\_\_\_ \$
6. Total feed cost \_\_\_\_\_ \$
7. Other expenses (including birds bought during the year) \_\_\_\_\_ \$
8. Total expenses (add lines 5, 6, 7) \_\_\_\_\_ \$
9. Net income or loss from project (line 4 minus line 8) \_\_\_\_\_ \$
10. A. Number of birds started \_\_\_\_\_  
 B. Number of birds raised \_\_\_\_\_  
 C. Number of birds that died \_\_\_\_\_
11. Percent death loss (line 10c divided by line 10a × 100) \_\_\_\_\_ %

Value of Birds at Beginning of 4-H Year			Value of Birds at Close of 4-H Year		
	Number	Value		Number	Value
Chickens		\$	Chickens		\$
Turkeys			Turkeys		
Pigeons			Pigeons		
Waterfowl			Waterfowl		
<b>TOTAL</b>		\$	<b>TOTAL</b>		\$
(column number)	(1)			(2)	

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 MG-26 (Revised) May 1998

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File code: 4-H Youth-2



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# Kansas 4-H Poultry Leader Notebook

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# Parts of a Chicken

## *Poultry, Level I*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Ten external parts of a chicken
- To relate the parts to their specific function

#### ABOUT THEMSELVES:

- The importance of understanding their preferred learning style

### Materials Needed:

- Activity Sheet 1, Parts of a Chicken
- Leader's Key, Activity Sheet 1, Parts of a Chicken
- Labels with chicken part names
- Pencils, crayons or color markers
- Activity Sheet 2, Color a Rainbow Chicken
- Member Handout 1, Comb Types

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

Approximately 30 terms are used to describe the different external (or outside) parts of a chicken. A knowledge of these parts is necessary to recognize the characteristics of the species, breeds and varieties of poultry that make them different from each other. Knowing these parts will also help to determine the sex of a chicken, and whether a hen is laying or not.

The diagram shows the major external parts of a female chicken. The male and female chicken have many identical parts. The (1) **beak** is the mouth-piece of the bird. The lower part is hinged at the jaw and is movable; the upper part is attached to the skull. The (2) **comb** and (3) **wattles** are red, soft, fleshy appendages on the head of the chicken. The size and redness of these appendages vary. A non-laying hen will have a small, dull-appearing comb and wattles; a layer will have large, bright red comb and wattles. There are different types of combs that are inherited characteristics of the breeds and varieties. The single comb shown on the diagram is most common. Other common types are the V-shaped, rose and pea combs. Chicken (4) **eyes** have color vision and show a preference for the violet and orange colors. They are slightly farsighted, which means they can see things better far away than close up. The color of the (5) **earlobe**, either red or white, depends on the breed. The (6) **ears** are small openings into the auditory canal protected by small feathers. The neck feathers are called (7) **hackle** feathers on the male and (7) **neck** feathers on the female. The (8) **breast** is located in the front of the chicken. The breast (9) **keel** bone is the lower portion of the skeleton. The back area on the male is

### Leader Notes

Make a large picture by enlarging the diagram on Activity Sheet 1, Parts of a Chicken. Make part labels that can be placed on the actual part of the picture. Have members put part names on the correct place on the picture. Have members write the names on their copy.

Pass out Member Handout 1, Comb Types, and discuss.

---

## Leader Notes

---

called the (10) **saddle** and the (10) **cushion** on the female. The (11) **tail** area has different types of feathers depending on the sex of the bird. For example, the male has long (12) **sickle** feathers. The (13) **wing** has various types of feathers that are not easily identified in the standing bird. However, when the wing is spread, the long (14) **flight** feathers and the (15) **covert** feathers which cover the base of the flight feathers are distinguishable. The (16) **thighs** are not easily seen as they are located along each side of the body and are covered with feathers. The lower part of (17) **leg** (drumstick) is also covered with feathers and bends at the (18) **hock** joint (ankle). The (19) **shank** which is the chicken's foot is covered with scales. The shank may be clean or feathered depending on the breed and variety. The **spur** is found on the male bird only, and is a bony growth which grows from the rear inside of the shanks. A chicken walks on its (20) **toes**. Most chickens have three toes projecting forward and one toe projecting back. (A few breeds have five toes.)

### Function of Parts

In the summer when it is really hot outside, people will perspire to release the excess heat from their bodies. Birds do not have sweat glands like humans do, but the comb and wattle areas allow heat to escape from the bird. What other things do birds do to keep cool? They also pant, spread their wings and lay on cool surfaces, such as the ground, to keep cool.

How do you stay warm in winter? During winter, people wear more clothing to protect themselves from the cold temperatures. How do you think birds keep warm? The feathers act as insulation against cold temperatures. When a bird is exposed to cold, its feathers will stand up to help conserve body heat. Birds also shiver like humans do when they get cold. Shivering helps to produce additional body heat.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. Which part was easiest to identify? Why?
2. Which part was the most difficult to learn? Why?

#### Process:

3. How many of the chicken's parts can you remember?
4. What parts are different for male and female chickens?

#### Generalize:

5. Which activity (matching or coloring) helped you learn the most parts? Why?

#### Apply:

6. Which activity (matching or coloring) did you like best? Why?

Pass out Activity Sheet 2, Color a Rainbow Chicken, to do at this session or to do at home for a review.

### GOING FURTHER:

- Draw pictures of the heads of a chicken, turkey and duck and label the parts.
- Obtain an adult male and female chicken and compare differences in appearance of feathers, comb and wattles.
- Observe other domesticated breeds of poultry and wild birds and compare differences in their appearance.
- Identify the proper names for young and adult chickens, turkeys, ducks and geese.

### REFERENCES

*Poultry Science*, Ensminger  
Minnesota 4-H Animals Science Project Guide

### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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# PARTS OF A CHICKEN

## POULTRY, LEVEL I

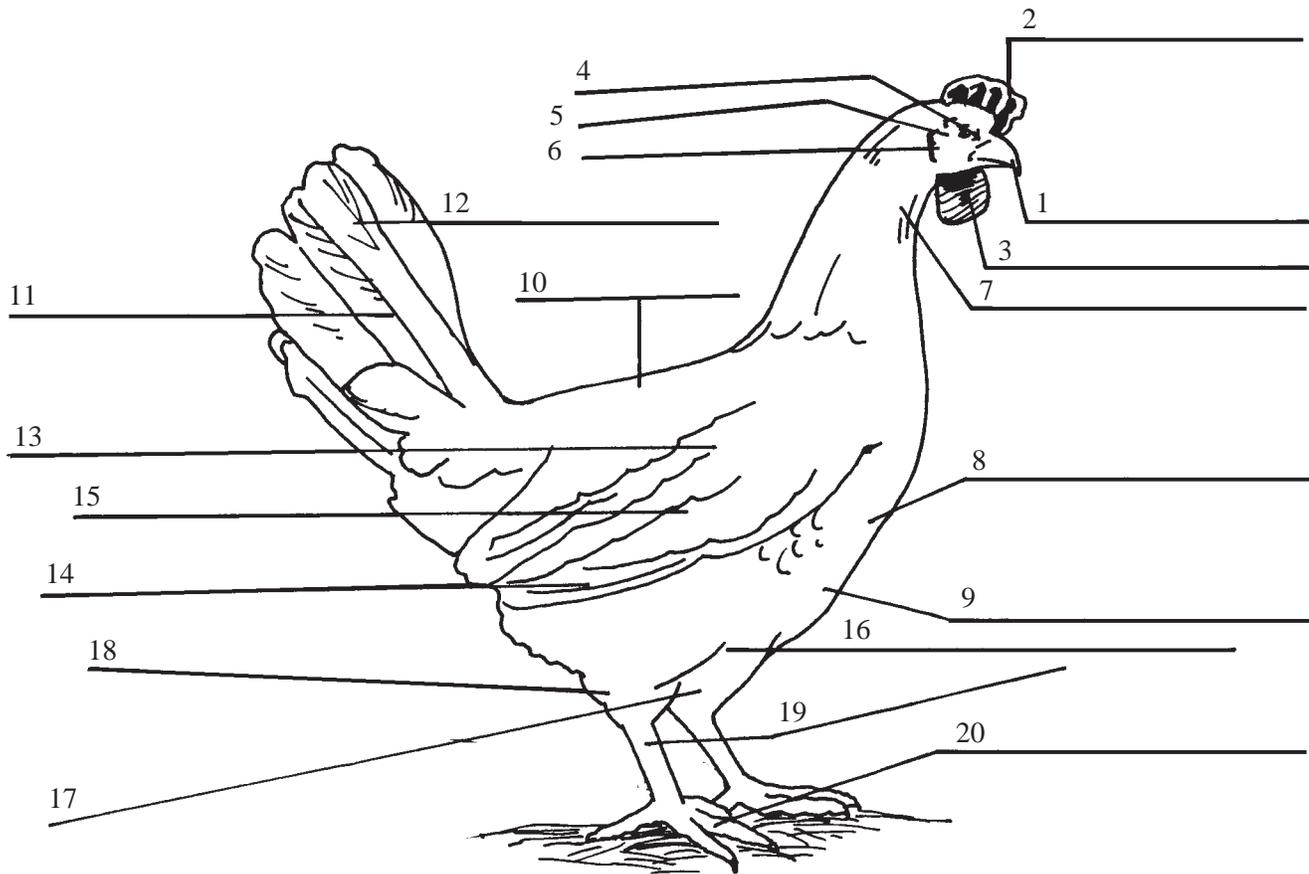
### Activity Sheet 1, Parts of a Chicken

Write in the part name on the matching blank.

Tail  
Comb  
Hackle feathers (male)  
or Neck feathers (female)  
Earlobe  
Covert Feathers  
Wing

Ear  
Eyes  
Tail feathers  
Flight feathers  
Thigh  
Leg  
Keel bone

Breast  
Shank  
Wattles  
Beak  
Back (saddle - male)  
Toes  
Wing



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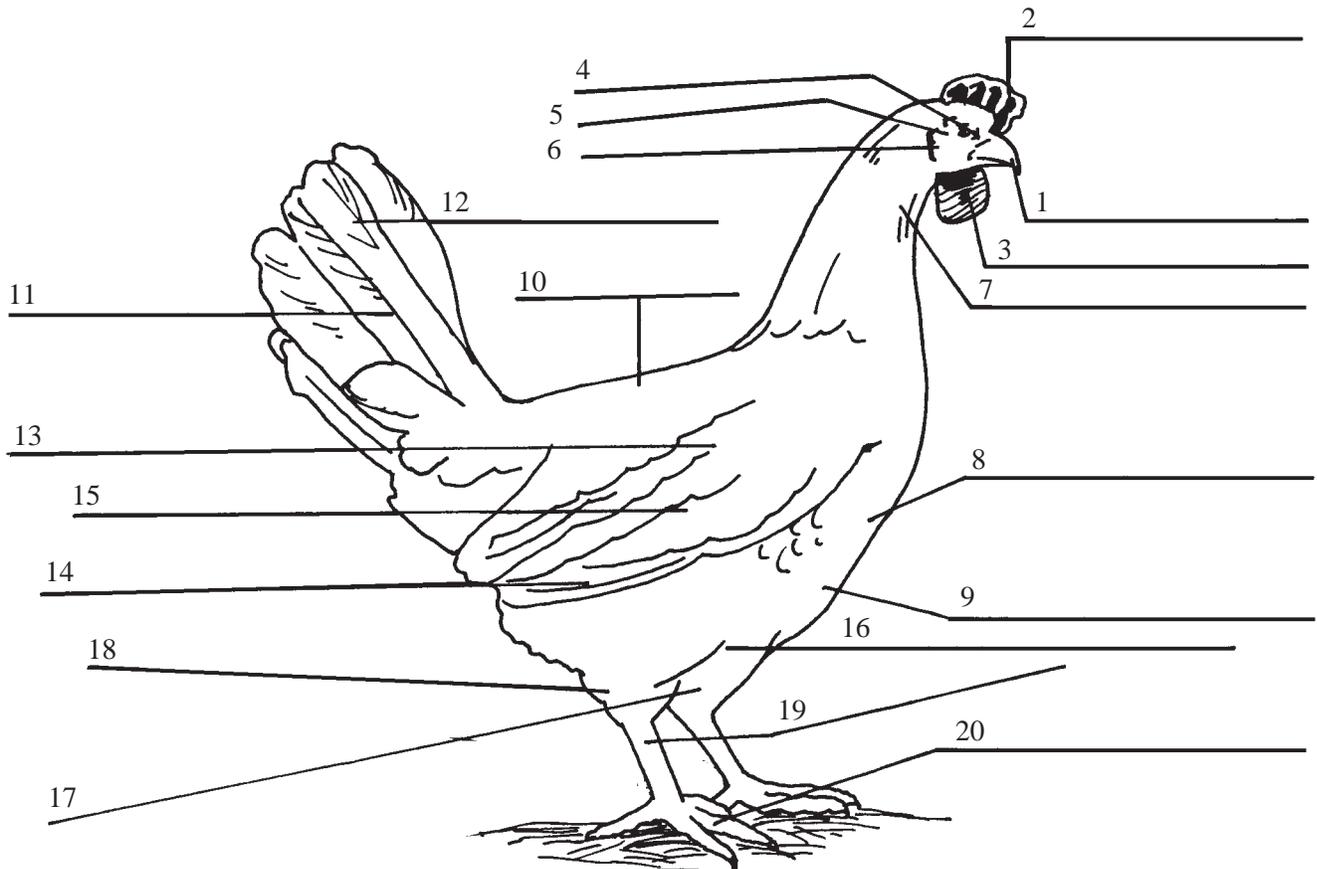
## PARTS OF A CHICKEN

### POULTRY, LEVEL I

#### Leader's Key, Activity Sheet 1, Parts of a Chicken

Key to Chart:

- |   |                      |
|---|----------------------|
| (1) Beak  | (11) Tail            |
| (2) Comb  | (12) Tail feathers   |
| (3) Wattles   | (13) Wing            |
| (4) Eyes  | (14) Flight feathers |
| (5) Earlobe   | (15) Covert feathers |
| (6) Ear   | (16) Thigh           |
| (7) Hackle feathers (male)<br>or Neck feathers (female) | (17) Leg             |
| (8) Breast  | (18) Hock joint      |
| (9) Keel bone   | (19) Shank           |
| (10) Back - saddle (male)<br>or cushion (female)        | (20) Toes            |



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**PARTS OF A CHICKEN**  
**POULTRY, LEVEL I**  
**Member Handout 1, Comb Types**

Different comb types of chickens



SINGLE COMB



V-SHAPED COMB



PEA COMB



ROSE COMB

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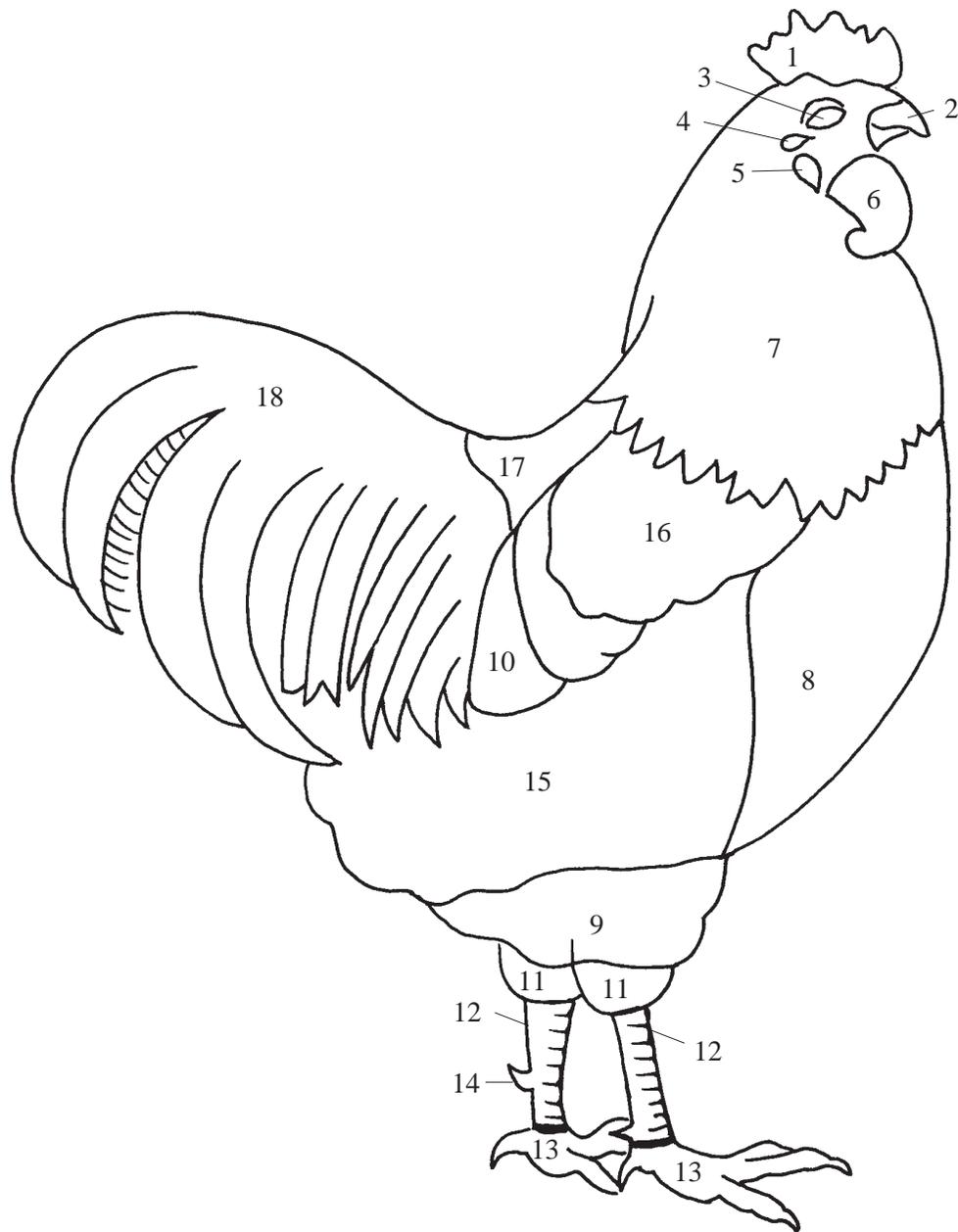
## PARTS OF A CHICKEN

### POULTRY, LEVEL I

#### Activity Sheet 2, Color a Rainbow Chicken

Color the parts according to this list.

- |                   |                  |                          |
|-------------------|------------------|--------------------------|
| 1. Comb—red       | 7. Neck—yellow   | 13. Foot and Toes—yellow |
| 2. Beak—yellow    | 8. Breast—orange | 14. Spur—orange          |
| 3. Eye—blue       | 9. Thigh—purple  | 15. Abdomen—blue         |
| 4. Ear—green      | 10. Wing—purple  | 16. Shoulder—green       |
| 5. Earlobe—purple | 11. Hock—red     | 17. Back—red             |
| 6. Wattles—red    | 12. Shanks—green | 18. Tail—yellow          |







# Name That Bird

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- To identify six species of poultry
- The similarities and differences between species

#### **ABOUT THEMSELVES:**

- The importance of their physical senses in life

#### **Materials Needed:**

- Pictures of poultry species (chicken, turkey, duck, goose, pheasant, guinea, peafowl, pigeon and quail)
- Cards with species names
- Large sheets of paper
- Magic markers or crayons
- Activity Sheet 3, Name That Bird

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

*Poultry* is a term used to define those species of birds that humans have domesticated (tamed and bred) for the purpose of providing eggs, meat and recreation. A *specie* is a group of birds of the same kind or form. The most common species of poultry are chickens, turkeys, ducks and geese which are kept primarily for eggs, meat or show. Other species like the ostrich, emu, guinea, peafowl, pigeon, quail and pheasant primarily serve humans by their beauty, companionship and sport.

What species have you seen? How would you describe them to someone else?

Today, you'll have the opportunity to identify each of these species of poultry. First, let's find out how many species you can already identify.

#### **Identifying Species of Poultry**

I have nine pictures of different species of poultry. Your job is to match the species card to the correct picture.

Now, let's match the names on your activity sheets and talk about each of these species.

**CHICKENS** are the most common species of poultry raised throughout the world. Chickens, like all other birds, have feathers and wings.

#### **Leader Notes**

Have members list species with descriptive words for each on a large sheet of paper. If group is large, divide into groups of two to three. Have each group report or discuss their lists.

Have members match cards with names to the correct picture of the bird. Let them check their answers at the end of the exercise.

Hand out Activity Sheet 3, Name That Bird, for members to fill in. Point out the physical features of the birds in the pictures as you describe them.

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## Leader Notes

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List these features on a chalkboard or large paper as the members list or report back. This information should be used as a check of their group listings, not as a lecture! Use information for other species (turkey, ducks, etc.) in the same manner.

Chickens come in many sizes, shapes and colors. What are some colors of chickens that you have seen?

Their feathers may have stripes, spots, patches, solid colors, two colors or a variety of colors, depending on the breed. An adult chicken may weigh as little as 1½ pounds or as much as 18 pounds. Chickens have plump bodies and small heads with sharp beaks. Chickens have several fleshy growths on their heads that most other birds do not. The flaps of loose skin hanging down from the throat are called **wattles**. On top of the head is a reddish-pink crest, called a **comb**. The comb and wattles are red because they have a rich blood supply. **Earlobes** grow on the side of the head. The earlobe color may be red or white, depending on the breed of chicken. Feathers cover most of the body of a chicken, and even the shanks (lower legs) and feet of some birds. Usually the shanks and feet are covered with scales. Roosters have an extra spike or spur sticking out from the rear inner side of the legs. Chickens have claws on their toes, which they use to defend themselves against an enemy, and to dig in the soil for insects and seeds to eat. Even though chickens have wings to fly, their wing muscles are poorly developed, so they can only fly a short distance at a time. Chickens fly mainly to escape enemies and to reach a perch on which to roost at night. Chickens are usually very noisy. They constantly cluck and squawk. The male chicken (rooster) has a distinctive sound of his own, sometimes referred to as crowing. When do you think roosters usually crow? What time of day do roosters do the most crowing?

**TURKEYS** are large birds that can weigh as much as 50 pounds or more. They are raised primarily for meat production. Have you ever eaten turkey? When?

The head and neck of turkeys are red and featherless. A long, loose piece of skin called a wattle extends from beneath the lower jaw along the neck. At the base of the neck are small, wart-like structures called **caruncles**. Male turkeys are called toms. If you look closely you will see they have a beard-like tuft of coarse hair hanging from the center of the breast. The color of domestic tom turkeys depends on the variety. Adult female turkeys, called hens, are dull in color and have no beards. They are smaller than the adult male turkeys. Their legs are similar to those of chickens, and are covered with scales. The tom turkey also has spurs on his legs like the male chicken. The vocal sound that we associate with a turkey is the gobbling call which the male makes.

**DUCKS** are classed as waterfowl and are among the most versatile birds. Ducks are raised for meat and egg production. They are related to geese and swans. They can live under a variety of climatic conditions. Ducks have waterproof feathers and webbed feet (the toes on each foot are connected by flaps of skin). They have a heavy body, short neck, short wings and flat, broad bill. Their bills have a hard horny growth at the tip called a **beak**. Ducks are known to be very vocal. The voice of the female is a loud, rather flat quack. The voice of male duck makes either a nasal sound or a whistle followed by a grunting sound.

**GEESE** are also classed as waterfowl, and are related to ducks and swans. People raise geese for meat and egg production, and as weeders, show birds or farm pets. They have flattened bills; a long neck; water-repellant feathers; long, pointed wings; a short tail; short legs and webbed feet. Scales cover the goose's legs. Their webbed feet make them good swimmers, but they also adapt well to living on land. Their face areas are feathered. Geese are larger than ducks and smaller than swans. Geese communicate by honking, instead of quacking or whistling. The long wings of wild geese enable them to fly for great distances. They are very graceful in flight and some kinds of geese can fly more than 1,000 miles without stopping to rest. All geese are migratory birds, which mean that they fly north in the spring and south in the fall. Have you ever seen a flock of geese fly in the sky. What direction were they flying? In what kind of formation were they flying?

**PHEASANTS** are generally classed as game birds, since people hunt pheasants for sport and meat. People also seek them for their long tail feathers. They are medium to large in size and are closely related to the domestic chicken. Most pheasants have a short, stout beak and a long tail. Some pheasants have combs and wattles similar to that of chickens. The male pheasants are very colorful with patterns of brightly colored feathers. The females usually have dull-brown and tan-colored feathers with black markings. Pheasants can fly, but only for short distances. They may reach speeds of 40 mph. The male pheasant communicates with cackles, crows, screams and whistles. The call of the hen is limited mostly to clucks and peeps.

**GUINEA FOWL** are close relatives of the pheasant. Their head and neck are bare and a bony ridge or helmet covers the top of the head. The most common guinea, the pearl, has gray feathers with small white spots. Guineas are known to make good watchdogs because of their usefulness in protecting the farm flock from predators by their loud, harsh cries and bad temper. They destroy insects in the garden. They do not scratch and, therefore, are less destructive than chickens. The cry of the female sounds like "buckwheat, buckwheat" or "put-rock, put-rock" and is quite different from the one-syllable shriek of the male.

**PEAFOWL** are mainly ornamental birds (birds pleasing to look at). Peafowl are one of the showiest of all birds because of their great size and beautiful feathers. They are related to the chicken and pheasant family. The most popular bird is the India Blue. Its feathers are colored either blue, white or green, with blue being the most common. The male peafowl is called a peacock and may grow almost as large as a turkey. Its breast feathers are colored metallic greenish-blue with purplish-blue underparts. They have a long train of greenish feathers brilliantly marked with bold spots that look like eyes. These long feathers grow from the back and not from the tail. This train of feathers may measure five times as long as the bird's body. When the male peacock spreads the feathers on his back, they form into a beautiful fan. In contrast, the female peafowl does not have a train and is more dull in color. Peafowl are regal, proud and desire attention. The males are inclined to be aggressive and not only attack other

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## Leader Notes

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fowl and small animals, but also have been known to fight their reflections in mirrors or shiny automobiles. Both the male and female produce a piercing, squawking, powerful cry, especially during the mating season. Peafowl choose to roost in a tall tree or on top of a building.

**QUAIL** are a type of small game bird that is often hunted for food or sport. Most adult quail are 6 to 8 inches long. The feathers of quail are colored in shades of brown, tan or gray that blend in with the environment of a pasture or woodland, protecting them from enemies by making them hard to see. The voice of a quail sounds like a squawk.

After characteristics or features are listed for each species, list the similarities and differences and then discuss them.

Example - See how many members can duplicate the sound of each species.

**PIGEONS** are very versatile birds. They are used for the sport of racing as flyers and performers, for show, for meat production, and in some cases to carry messages. The term pigeon is used to name any bird in the pigeon and dove family. The larger birds are called **pigeons** and the smaller birds are called **doves**. Pigeons have a plump body, a small head and short, sturdy legs. Because pigeons have large flight muscles in their breast, they are powerful and can fly at fast speeds. Most pigeons measure from 10 to 15 inches long. However, the smallest of the species grows about 6 inches long and weighs about 1 ounce. The feather colors of pigeons are usually black, blue, brown, white or gray. Pigeons drink in a way that is very unusual from other poultry birds. They stick their beak in the water and suck the liquid through their beak like a straw. Pigeons communicate through cooing sounds.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many poultry species could you identify?
2. What was the easiest species to identify? Hardest? Why?
3. What species would you like to raise? Why?

#### **Process:**

4. What characteristics help you identify a species? (size, beak or bill, feathers, sounds made, etc.)
5. What are some reasons for raising different poultry species?
6. What characteristics are significant for waterfowl?

#### **Generalize:**

7. What physical senses (sight, touch, hearing, smell, taste) help you the most in identifying poultry species? Why?
8. What senses do you use most in your everyday life? Why?

#### **Apply:**

9. Which senses do you think will be the most important to you in the future? Why?

### **GOING FURTHER:**

- Read a book or magazine about poultry and share what you learned at the next project meeting.
- Visit a poultry farm or zoo and observe the differences in the species.

### **REFERENCES:**

*KSU Poultry Handbook for Small Flocks*, Kansas State University,  
Manhattan, Kansas  
*Poultry Science*, Ensminger  
*Raising Chickens for 4-H*, Purdue University Cooperative Extension  
Service, West Lafayette, Indiana

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**NAME THAT BIRD**  
**POULTRY, LEVEL I**  
**Activity Sheet 3, Name That Bird**

Draw a line from the name of the poultry species to the correct picture.

Quail

Duck

Chicken

Pheasant

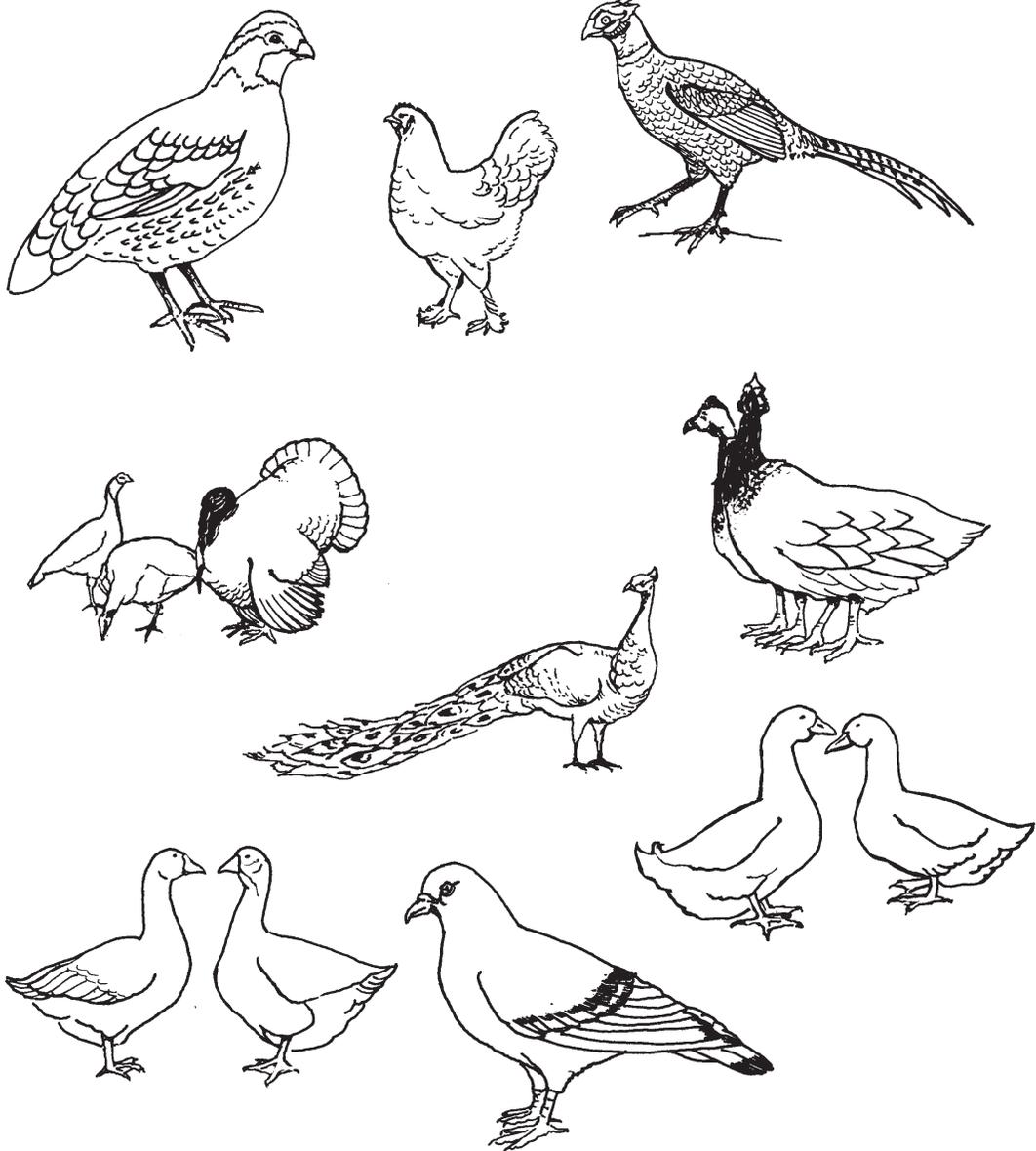
Turkey

Goose

Guinea Fowl

Pigeon

Peafowl



**NAME THAT BIRD**  
**POULTRY, LEVEL I**  
**Leader's Key, Activity Sheet 3, Name That Bird**

Draw a line from the name of the poultry species to the correct picture.

Quail ————

Duck ————

Chicken ————

Pheasant ————

Turkey ————

Goose ————

Guinea Fowl ————

Pigeon ————

Peafowl ————

The image contains several line drawings of poultry birds. On the left, there is a list of names: Quail, Duck, Chicken, Pheasant, Turkey, Goose, Guinea Fowl, Pigeon, and Peafowl. Lines connect these names to the drawings: Quail to the first bird, Duck to the second, Chicken to the third, Pheasant to the fourth, Turkey to the fifth, Goose to the sixth, Guinea Fowl to the seventh, Pigeon to the eighth, and Peafowl to the ninth. The drawings include a quail, a chicken, a pheasant, a turkey, a guinea fowl, a peafowl, and two geese.





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# Beginning to Set Goals in Your Poultry Project

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- How to set project goals

#### **ABOUT THEMSELVES:**

- The importance of setting goals

#### **Materials Needed:**

- Chalkboard or flip chart
- Poultry Member Guide and Annual Report (MG-26)
- Member Handout 2, Learning Topics

**ACTIVITY TIME NEEDED:** 30 MINUTES

#### **ACTIVITY:**

Each year you will set several goals to accomplish during the project year. Goals help you get where you want to go.

If this is your first year, you might want to have just one goal, to select your project bird. Remember that before you select a bird, you must decide the purpose of the bird (meat, layer, show or dual-purpose).

List one or two goals (MAP Step 1) on page 2 for this project year.

Breaking a goal into steps (MAP Step 2) helps you better understand the action needed to make that goal a reality. Some goals have many steps, some have a few.

With each step you need to set a deadline (MAP Step 3). Deadlines are when you expect to have that step of your goal done. As you meet the deadline you set for each step, you need to use an energizer (MAP Step 4). Energizers encourage you to move toward your goals by offering a small reward for meeting your deadline.

Now complete MAP Steps 6 and 7. You have set your goals for Year 1 of your poultry project.

#### **Leader Notes**

Put participants into groups of three or four. Mix new project members with youth who have had some experience with poultry or other animal projects. Hand out Member Guide and Annual Report (MG-26) plus Member Handout 2, Learning Topics. Let them help each other decide what their goals for the year will be.

Allow time for them to share their goals with a project friend and sign each other's MAP Worksheets.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What is your first goal for the project year?
2. What goal do you like best? Why?

#### **Process:**

3. Why are these goals important?
4. Why is it important to set goals?

#### **Generalize:**

5. What are the advantages of working in a group when setting goals?

#### **Apply:**

6. What other groups have you worked in where you needed to set goals to help you make decisions?

### **GOING FURTHER:**

- Use the goal-setting process to set group goals

### **REFERENCES:**

Lessons on:

- What Bird Will I Raise
- Poultry Breeds
- Catching and Handling Poultry

#### **Author:**

James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Poultry Design Team

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**BEGINNING TO SET GOALS IN YOUR POULTRY PROJECT**  
**POULTRY, LEVEL I**  
**Member Handout 2, Learning Topics**

Place a check mark next to five of the most interesting topics you would like to learn about in your poultry project.

- Parts of a Chicken
- Name That Bird
- Common Poultry Terms of Different Species
- Poultry Breeds
- Breeds of Poultry for Projects and Shows
- What Bird Will I Raise?
- Nutritional Needs and Problems in Poultry
- Is Your Bird Sick?
- Catching and Handling Poultry
- Washing That Bird
- Why Do We Raise Poultry?

**Think Back:**

Please write one or two things you have learned about poultry so far. What is something you have learned about yourself while studying poultry?

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# Common Poultry Terms for Different Species

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Five common chicken terms
- Five common turkey, duck and goose terms
- Five general terms of various poultry species

#### **ABOUT THEMSELVES:**

- Their feelings about using cards and matching to learn
- How they feel about their ability to identify parts of live things

#### **Materials Needed:**

- Pictures or live birds
- Note cards with poultry terms
- Member Handout 3, Common Poultry Terms

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

Knowing the correct poultry terms is very important when involved in poultry projects. The *American Standard of Perfection* lists the terms used to describe the external (or outside) physical characteristics of poultry. Knowing these terms is essential to the identification and judging of exhibition and production types of poultry, selection and preparing birds for show, giving demonstrations, understanding how judges judge poultry, and just talking about poultry with friends.

#### **CHICKEN TERMS**

Approximately 30 terms are used to describe the different external parts of a chicken. The major terms are shown on the illustration.

The **beak** (a) on a chicken is pointed because the chicken is a grain eater. The **comb** (b) is used to identify breeds and varieties. Common comb types are single, rose and pea. The **earlobes** (c) are patches of smooth skin located below the ears of the bird. Earlobe color is either white or red and is used for breed identification. The **wattles** (d) are fleshy appendages attached to the lower edge of the head. The feathers on the neck of the chicken are **hackles** (e) on the male and **neck** (e) feathers on the female. The **main tail** (f) feathers arise from the tail head of both male and female chickens. The **sickle** (g) feathers are the long flowing feathers on the male birds. The **saddle** (h) feathers are those that flow from the back down each side of the bird. The **hock** (i) is the joint between the drumstick and the leg or **shank** (j). The **spur** (k) is a bony projection arising from the inside of the bird's legs. The spur is prominent in the male and is used for fighting.

#### **Leader Notes**

Use the *Standard of Perfection* if you need terms in addition to those in this lesson.

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## Leader Notes

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### TURKEY TERMS

The **snood** (a) of the turkey is similar to the comb of a chicken. It is larger in the tom than hen. It becomes enlarged during the mating ritual by the tom. Sometimes, it becomes injured when toms fight, which allows disease organisms to enter the bird's body. The **caruncle** (b) is reddish, fleshy material on the naked portions of the head, face, and neck of the turkey and Muscovy duck. It is similar to the wattles on the chicken. The **beard** (c) is a small tuft of long, coarse, black hairs projecting from the upper part of the breast of a tom turkey.

### DUCK TERMS

The **bill** (a) is the horny formation projecting from the head of waterfowl. It consists of the upper and lower mandibles which form the forward mouth parts. The **bean** (b) is a raised, hard, bean-shaped projection on the tip of the bill of waterfowl. Sometimes, the bean is removed from ducks to prevent them from seriously harming or killing each other.

### GOOSE TERMS

The head of a goose is different from the head of a duck because of the presence of a **dewlap** (b). This is a loose fold of skin under the rear of the **bill** (a) that extends along the throat area. Its absence constitutes a disqualification in some breeds of geese such as the African and Toulouse.

### GENERAL TERMS

Proper terms for common species of domesticated poultry.

Species	Young of either sex	Mature Male	Mature Female
Chicken	Chick	Cockerel* Cock	Pullet* Hen
Duck	Duckling	Drake	Duck
Goose	Gosling	Gander	Goose
Guinea	Keet	Cock	Hen
Peafowl	Chick	Peacock	Peahen
Turkey	Poult	Tom	Hen

\* Terms for male and female chickens, respectively, that are less than 1 year of age.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What terms are easy to remember? Why?
2. What term was the most difficult? Why?

**Matching Game:** Make up two sets of cards with a term on one side and its definition on the other. Use one set with the terms showing and the other set with the definitions showing. Use terms from this lesson. Give each group of two or three members about 10 terms and definitions to match. Have them check their matchings by turning the cards over. Ask each group to discuss one or two terms and tell how they would use the terms in a sentence. After members have completed this activity, use a live bird or picture to point out what the terms describe.

**Process:**

3. What part of a bird do you find the most unusual or different? Why?
4. What was significant about the terms used for young birds or names for different sexes of a species?

**Generalize:**

5. What other experiences have you had where you had to learn parts or terms?
6. Which learning style do you prefer (matching or flash cards)? Why?

**Apply:**

7. How will it help you in the future to know poultry parts?
8. Why do you think it is important to know parts of birds, animals and other items?

**GOING FURTHER:**

- Attend a poultry show and identify parts on all species.
- Share poultry terms with your class at school.

**REFERENCES**

*Poultry Production Manual*, A.W. Adams, Department of Animal Sciences and Industry, Kansas State University

**Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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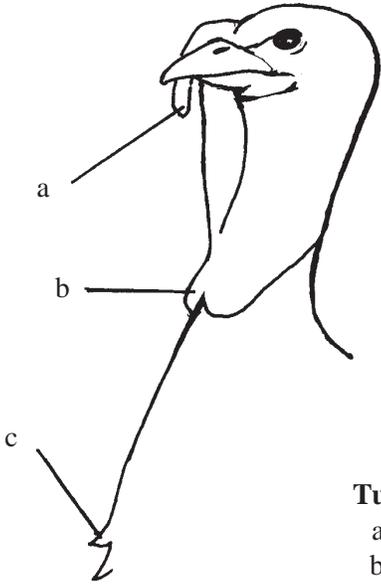
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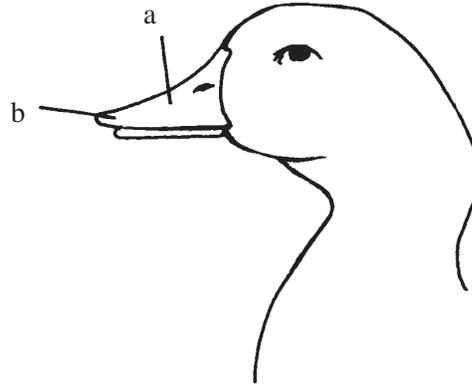
# COMMON POULTRY TERMS OF DIFFERENT SPECIES

## POULTRY, LEVEL I

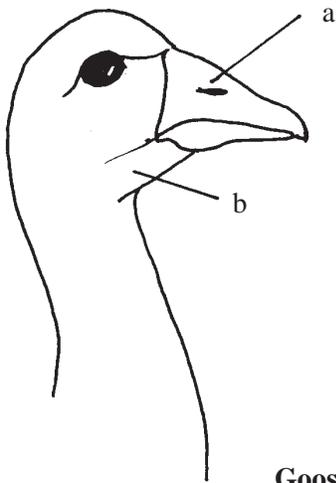
### Member Handout 3, Common Poultry Terms



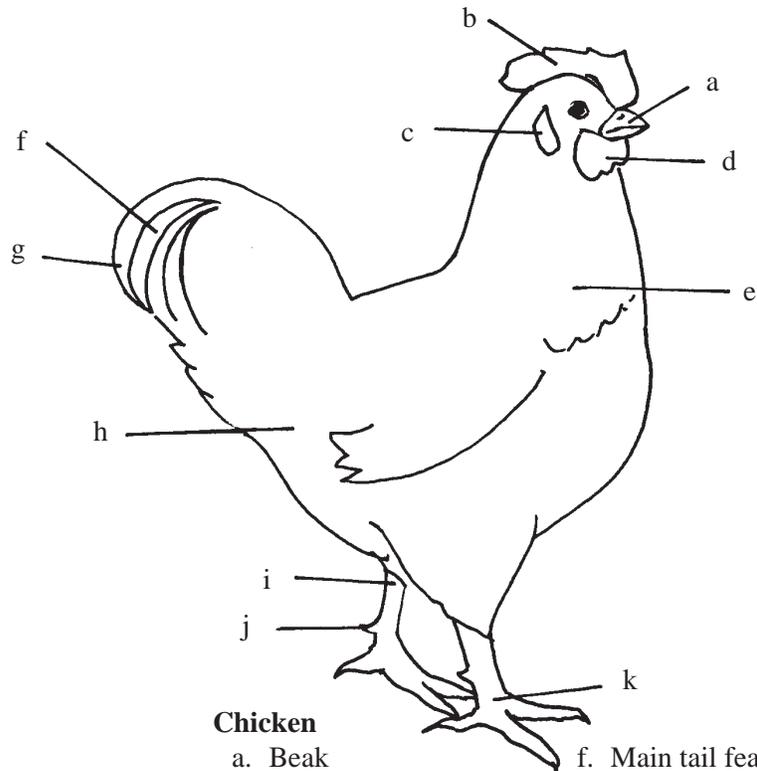
**Turkey**  
 a. Snood  
 b. Caruncle  
 c. Beard (male)



**Duck**  
 a. Bill  
 b. Bean



**Goose**  
 a. Bill  
 b. Dewlap



**Chicken**  
 a. Beak  
 b. Comb  
 c. Earlobe  
 d. Wattle  
 e. Hackle (male)/  
 Neck (female)  
 f. Main tail feathers  
 g. Sickle feathers (male)  
 h. Saddle feathers  
 i. Hock  
 j. Spur  
 k. Shank



# Poultry Breeds

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Ten breeds or varieties of poultry
- Differences between breed, variety, type and strain
- Purpose of 10 poultry breeds (meat, eggs, exhibition)

#### **ABOUT THEMSELVES:**

- The importance of different poultry breeds to people

#### **Materials Needed:**

- Color pictures or diagrams of different breeds of poultry
- Cards with names of poultry breeds
- *American Standard of Perfection* book (use to obtain breed descriptions)
- Activity Sheet 4, Poultry Breed Match
- Leader's Key, Activity Sheet 4, Poultry Breed Match

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

If you look at chickens, ducks or any other birds, do they all look alike? Of course not. How are they different? You will notice that they are different sizes, shapes, colors and have other physical features that make each one unique.

When we talk about poultry, we use several terms to describe what kind they are such as breed, variety and strain. Do any of you have an idea of what these terms describe?

The term **breed** is used to describe a group of birds which are related by breeding. All birds of the same breed possess the same distinctive shape, general weight and other physical traits such as comb type, skin and feather colors.

**Variety** is a subdivision of a breed. A variety is identified by either feather color (black, white, red or brown), feather pattern, or comb type (single comb, rose comb, etc.). A breed may have many varieties.

The term **strain** is used to describe a specific group within a breed or variety which has distinctive characteristics. A strain is usually developed by a breeder who does not allow any outside bloodlines to enter into his or her flock for a number of years. The strain is usually named after the breeder who developed it.

#### **Leader Notes**

Give members a chance to define each term in small groups.

Show pictures of several breeds and let members point out the differences.

Show pictures of several varieties of one breed from the *Standard of Perfection* and let them point out the differences they see.

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## Leader Notes

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Show members the *Standard of Perfection* book and flip through pages to give them an idea of what is included.

You can use the list of breeds and varieties provided or make up your own list. Use descriptions from the *Standard of Perfection*. You might want to copy the descriptions on index cards. Hand out cards to members and see if they can match the name to the picture as you describe the breed or variety.

As you talk about each of the purposes, show a picture of those breeds that fall into these categories.

The book I'm showing you is called *The American Standard of Perfection*, which lists over 300 breeds and varieties of chickens, ducks, geese and turkeys. This book is published by the American Poultry Association, Inc.

Now, let's take a look at the different breeds and see if you can match the name on the card with the picture as I describe them to you.

People who raise poultry usually choose a particular breed, variety or strain for a specific purpose, such as exhibition, meat production or egg production.

Exhibition birds are raised for competition in various shows. They may be either normal or miniature in size. The miniature chickens are called bantams.

Egg production breeds and varieties are those that produce a large number of eggs. Most of the egg-laying hens are white feathered. They are usually small in size, so they don't require as much feed as the larger breeds.

Meat production or broiler production breeds and varieties are usually larger in size and grow rapidly, but lay fewer eggs than egg production types.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many poultry breeds do you know?
2. What breed might you raise? Why?

#### **Process:**

3. What are some characteristics that help determine breed or variety?
4. What are the main functions of different breeds or varieties? (exhibition, egg production, meat production or pleasure/recreation)

#### **Generalize:**

5. How do poultry breeds differ between species (chickens, ducks, geese, etc.)?
6. What are significant differences between breeds of other animals?
7. What is the importance of different poultry breeds to people?

#### **Apply:**

8. How will your knowledge of poultry breeds help you in the future?

### GOING FURTHER:

- Make a poster of different breeds and varieties of poultry.
- Visit a hatchery or poultry farm to see what different breeds or varieties they raise.

### REFERENCES:

*Poultry Science*, Ensminger

*The Standard of Perfection*, American Poultry Association, 26363 South Tucker Road, Estacada, Oregon 97023

### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University; Poultry Design Team

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# POULTRY BREEDS

## POULTRY, LEVEL I

### Activity Sheet 4, Poultry Breed Match

Draw a line from the breed name to the correct picture.

#### Chickens

Rhode Island Red

Barred Plymouth Rock

Sebright

Cornish

Leghorn

Polish

Houdan

#### Geese

Embden

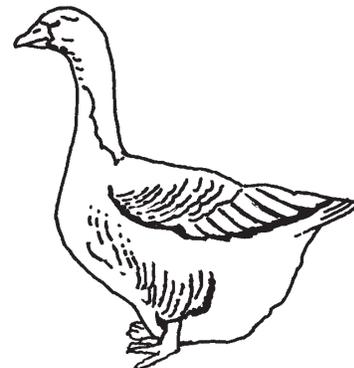
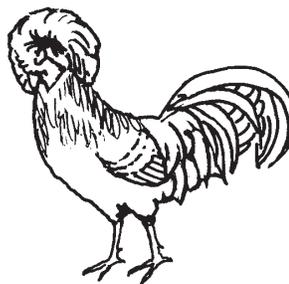
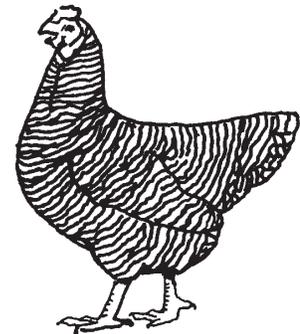
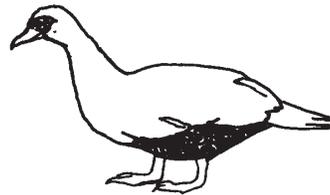
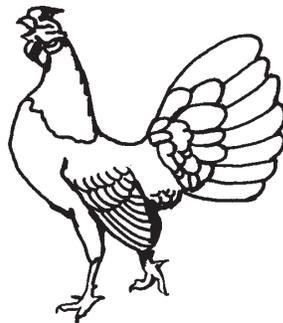
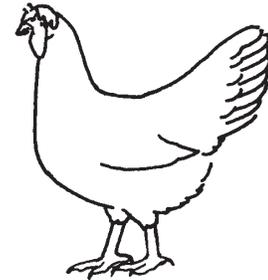
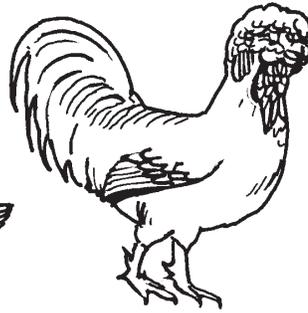
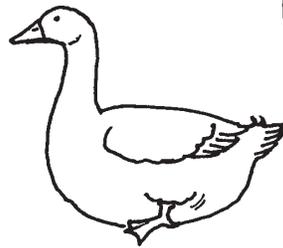
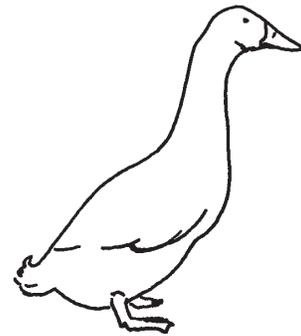
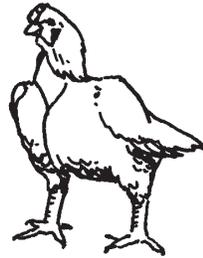
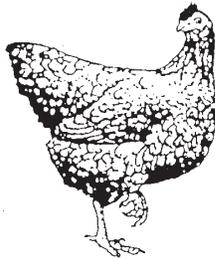
Toulouse

#### Ducks

Muscovy

Pekin

Rouen



**POULTRY BREEDS**

**POULTRY, LEVEL I**

**Leader's Key, Activity Sheet 4, Poultry Breed Match**

**Chickens**

Rhode Island Red

Barred Plymouth Rock

Sebright

Cornish

Leghorn

Polish

Houdan

**Geese**

Emden

Toulouse

**Ducks**

Muscovy

Pekin

Rouen





# Breeds of Poultry for Project and Show

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- To identify the differences between standard breeds, strain crosses and crossbreeds
- To identify the main function of five breeds, varieties, strains or types

#### **ABOUT THEMSELVES:**

- Decisions that need to be made in choosing the type of project they wish to have
- Skills they do well

### Materials Needed:

- *American Standard of Perfection* book
- Pictures or poultry magazines to show various breeds
- Poultry catalog
- Index cards with breed, variety and purpose of breed or variety
- Member Handout 4, Breed Purposes
- Activity Sheet 5, Breed Name Word Find
- Leader's Key, Activity Sheet 5, Breed Name Word Find

### ACTIVITY TIME NEEDED: 45 MINUTES

#### **ACTIVITY:**

When you go shopping for new clothes or shoes, what are some things you need to know before you start? Before you buy a new pair of shoes or clothing, you usually have an idea of why you are going to wear them. You wouldn't go out and buy a dress, new suit or dress shoes to wear for playing sports or doing chores. Some clothing and shoes are not appropriate for every occasion.

It's the same idea when you select your poultry project birds. You need to know the various breeds and varieties of poultry and for what purpose you want to raise birds. Do you want to raise birds for egg and/or meat production, or for exhibition or show?

Today, we'll learn about the differences between standard breeds, strain crosses, crossbreeds and bantam chickens, and the different breeds of ducks, geese and turkeys, so you can make good decisions when you choose what poultry you will have for your project.

1. Let's talk about standard breeds first. Does anyone know what a standard breed is? **Standard breeds** or pure breeds of chickens are those breeds and varieties that have been recognized for specific characteristics

#### **Leader Notes**

Ask members what other project they plan for before they select or buy their materials needed. What did they do or think about?

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## Leader Notes

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As you discuss each of the classifications of poultry breeds, show them pictures from the *Standard of Perfection*, poultry magazines or other books.

for many generations and, when mated together, produce offspring with those same characteristics. They can be used for egg production, meat production or exhibition projects.

Standard breed chickens may be exhibited as a single young or old bird of either sex. Exhibition-type stocks are available from all recognized breeds and varieties of poultry. These classes are usually designated as either large or small (bantam).

2. **Strain Crosses** are also called inbreds or hybrids. In chickens, they are usually White Leghorns. These birds have been selected for maximum egg production and small body size, and would be a good selection if you are going to raise chickens primarily for egg production. When you select a strain cross of Leghorns, they will usually be designated by the breeder's trade name such as DeKalb, Hyline, Babcock, etc. You should not use these birds for a meat production project because of their small body size.

3. Does anybody have an idea what a crossbreed is? A **crossbreed** results from the crossing of two different breeds or varieties. Crossbreeds are raised for both egg and meat production. Some examples of crossbreeds for an egg production project would be Austra-White, California White, Sex-Links and other similar crosses. If you are wanting to raise them for meat production, you should choose a crossbreed such as Cornish-Rock or Rock-Cornish.

You may explain that "bantams" are often called "banties" by the public.

4. If you want to raise and exhibit **bantams** (chickens of smaller size), you should select pure breeds rather than strain or crossbreeds. Bantams are available in most standard breeds of fowl. You can select from many other breeds such as Old English Game, Frizzle, Rosecomb, Sebright, Houdan and Polish. When you exhibit bantams at a show, enter them as a single bird of either sex in either the standard-bred bantam young or old classes. Most shows do not have a crossbred bantam class.

If you plan to raise your chickens for meat and egg production, you should look for **dual-purpose breeds** that have qualities favorable for both egg and meat production. Some breeds that fit in this category are the Rhode Island Red, New Hampshire and Plymouth Rock. If you would choose to exhibit these breeds at a fair, you would show a group of three pullets or hens.

If you are planning to raise chickens for meat production only, you would choose a meat-type breed, such as the White Plymouth Rock and White Cornish. In this class for exhibition, you would show a group of three pullets or cockerels. Can you identify some standard breeds in the pictures I have here?

Now that we have talked about the various breeds and varieties of chickens, let's move on to ducks and geese. Most shows do not have a crossbred waterfowl class, so you should select a purebreed for your project. You would usually enter one bird of either sex.

Common breeds of **geese** are African, American Buff, Canada, Chinese, Egyptian, Embden, Pilgrim, Pomeranian, Sebastopol and Toulouse.

Common breeds of **ducks** are Alyesbury, Buff, Call, Campbell, Cayuga, Crested, East India, Mallard, Muscovy, Pekin, Runner, Rouen and Swedish.

If you decide to raise **turkeys**, you need to select a variety for either a meat production project or for show. If you choose to raise turkeys for meat production, you can select a commercial strain cross of Broad Whites, such as Nickolas, Cuddy, BUTA and Hybrid. White-feathered varieties are easier to prepare for eating than dark-feathered varieties.

If you want to have a Turkey project that is more for show purposes, you should select a variety that has a slower growth rate and poorer body conformation. The Beltsville Small White, Black, Bourbon Red, Bronze, Narragansett, Royal Palm, Slate and White Holland are more suitable for show purposes.

Hopefully, you now have an idea of what breed of poultry you are going to select for your project.

At the end of the lesson, have members divide into teams and give them index cards with breed names. Play a matching game with the pictures.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What breed or variety of poultry do you like? Why?
2. Which breeds are the easiest to identify? Why?

#### **Process:**

3. What are the three purposes for raising poultry?
4. Why would you **not** select an egg-type chicken for meat production?
5. Why are white-feathered turkey varieties better for meat production?

#### **Generalize:**

6. What other animals are bred for specific purposes?
7. Why is it important to know the purpose or reason for what you do?
8. What types of things do you do well?

#### **Apply:**

9. How do you think you will use your good skills in the future?

### **GOING FURTHER:**

- Make a poster about the different breeds and varieties of poultry and share with members at the next meeting or classmates at school.
- Visit a poultry hatchery.
- Attend a poultry exhibition and identify what breeds and varieties are most popular.
- Read a book about poultry and share with members at the next meeting or at school.

### **REFERENCES:**

*The Bantam Standard*, American Bantam Association, Box 610, N Amherst, Maine 01059

*The Standard of Perfection*, American Poultry Association, 26363 S Tucker Road, Estacada, Oregon 97023

### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University; Poultry Design Team

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## BREEDS OF POULTRY FOR PROJECTS AND SHOWS

### POULTRY, LEVEL I

#### Member Handout 4, Breed Purposes

<b>Species</b>	<b>Purpose</b>	<b>Breed, variety, crossbreed, or strain cross most suitable</b>
Chickens	Egg Production	Leghorn (white eggs) Plymouth Rock (brown eggs) Rhode Island Red (brown eggs) New Hampshire (brown eggs) Sex Links (brown eggs)
	Meat Production	Cornish-Rock Rock-Cornish
	Dual-Purpose	Plymouth Rock Rhode Island Red New Hampshire Red
	Exhibition	Bantams: Houdan Polish Sebright
Ducks	Meat Production	Pekin Rouen Muscovy
	Egg Production	Khaki Campbell Indian Runner
Geese	Egg and Meat, Exhibition	Emden Toulouse Buff
Turkeys	Meat Production	Broad White
	Exhibition	Broad Breasted Bronze Bourbon Red Narragansett

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## BREEDS OF POULTRY FOR PROJECTS AND SHOWS

### POULTRY, LEVEL I

#### Activity Sheet 5, Breed Name Word Find

Find and circle the breed names in the letter diagram below.

Cornish  
Bantam  
Houdan  
Wyandotte  
Pekin

Rhode Island Red  
Muscovy  
Khaki Campbell  
Toulouse  
Broad White

Rouen  
Leghorn  
New Hampshire  
Embden

K A X Y M U S C O V Y R R  
H O U D A N P N L A B O H  
A M I Z B U F E L G T U O  
K G A N A E E W X R O E D  
I C O R N I S H I I U N E  
C Y G S T S H A O P L Q I  
A W W X A C B M N M O L S  
M R T G M E E P A R U E L  
P E K I N Y J S W F S G A  
B B R O A D W H I T E H N  
E F Q C V U A I U K L O D  
L E M B D E N R A Y B R R  
L I J L O N R E W S A N E  
W Y A N D O T T E U A Q D

**Think Back:**

What do you remember most about the birds you have studied? Why?

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# BREEDS OF POULTRY FOR PROJECTS AND SHOWS

## POULTRY, LEVEL I

### Leader's Key, Activity Sheet 5, Breed Name Word Find

Find and circle the breed names in the letter diagram below.

Cornish  
Bantam  
Houdan  
Wyandotte  
Pekin

Rhode Island Red  
Muscovy  
Khaki Campbell  
Toulouse  
Broad White

Rouen  
Leghorn  
New Hampshire  
Embden

K	A	X	Y	M	U	S	C	O	V	Y	R	R
H	O	U	D	A	N	P	N	L	A	B	O	H
A	M	I	Z	B	U	F	E	L	G	T	U	O
K	G	A	N	A	E	E	W	X	R	O	E	D
I	C	O	R	N	I	S	H	I	I	U	N	E
C	Y	G	S	T	S	H	A	O	P	L	Q	I
A	W	W	X	A	C	B	M	N	M	O	L	S
M	R	T	G	M	E	E	P	A	R	U	E	L
P	E	K	I	N	Y	J	S	W	F	S	G	A
B	B	R	O	A	D	W	H	I	T	E	H	N
E	F	Q	C	V	U	A	I	U	K	L	O	D
L	E	M	B	D	E	N	R	A	Y	B	R	R
L	I	J	L	O	N	R	E	W	S	A	N	E
W	Y	A	N	D	O	T	T	E	U	A	Q	D





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# What Bird Will I Raise?

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Poultry species or breeds available in your area
- Types of birds that can be raised and/or exhibited in your area or county
- Factors to use in selecting a species or breed

#### **ABOUT THEMSELVES:**

- How they feel about using a decision-making process
- Their feelings about making choices

#### **Materials Needed:**

- Poultry Member Guide and Annual Report (MG-26) for each member (appears at end of Introduction)
- Chalkboard or flip chart
- Chalk or markers

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

Today, we are going to review some of the previous lessons, so you can decide what species or breed of poultry would best fit your family situation. Depending on where you live, you may be able to raise a lot of chicks or only keep a few for fun or show. You will also need to determine if you plan to raise birds for meat, eggs or exhibition.

Look at the pictures of the various breeds in your leader's *Standard of Perfection for Poultry* as you talk and discuss the major differences between breeds.

#### **POULTRY TYPES**

**Market poultry** is a production and marketing portion of the project that is well suited for younger (Level I) members using broilers, roasters, capons or turkeys. The objective with these birds is to properly grow and process meat-type poultry for home consumption or sale.

Considerations:

1. Start with any number of chicks or poults of either sex for broilers, roasters and turkeys, or cockerels for capons.
2. Care for the flock using accepted management and feeding practices.
3. Keep records of income and expenses.
4. Process the birds for eating at home or to sell.

#### **Leader Notes**

This lesson should be used only for members who have the opportunity to actually raise birds. The ultimate objective of the poultry project is not to make poultry producers out of each member, but rather to use poultry as a vehicle to enhance each member's development. It is also important to prepare youth to be more knowledgeable consumers of poultry products by understanding poultry production. As a project leader, you can play an important role by helping members to: (1) select the species, breed or type that will be best for their conditions and interests, and (2) plan their project lessons in a manner that will allow them to enjoy the activities, increase their knowledge and realize a sense of achievement.

Be prepared to explain that a capon is a castrated male chicken.

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## Leader Notes

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Divide the members into small groups. Have them list or name various species or breeds for you to write on a chalkboard or flip chart. As a group, discuss the differences, advantages and disadvantages of the species or breeds listed. Assist members in putting their plans for raising particular breeds or species on their Poultry Member Guide and Annual Report. Copies can be made from the report that appears at the end of the Introduction or obtained from your local K-State Research and Extension office.

**Egg production** and marketing is best suited for Level II members or older using egg-type chickens. The objectives for these birds is to manage them for the production of high-quality eggs for eating at home or to sell.

Considerations:

1. Start by growing pullet chicks to maturity or by purchasing (ready-to-lay) pullets.
2. Care for the flock using accepted management and feeding practices.
3. Keep production and expense records.
4. Process and package eggs for home consumption or sale.
5. Requires housing for entire year.

**Exhibition birds** are best suited for Level III and IV members who prefer to care for birds in preparation for competitive showing only.

Considerations:

1. Start with any number of exhibition-type, standard-bred (purebred) chickens, turkeys, ducks or geese of either sex.
2. Care for birds using accepted management and feeding practices.
3. Keep appropriate records.
4. Select birds and properly prepare them for show.

**Pigeons** may be raised for meat, racing or exhibition. They adapt themselves to living under a variety of conditions. These birds are easy to raise, fairly inexpensive to keep and require very little space. This is one species that is seldom restricted by zoning regulations.

Considerations:

1. Own and care for a minimum of one pair of birds.
2. Maintain appropriate records.
3. Plan to learn how to exhibit and/or race the birds.

After you have selected two or three breeds that you like, ask your project leader to review your choices with you and your parents before making your final decision.

### **DIALOGUE FOR CRITICAL THINKING:**

**Share:**

1. How many species of poultry did you talk about?
2. How many breeds did you list?

**Process:**

3. What kind of poultry is best for your situation? Why?

**Generalize:**

4. How did you remember all the information you had to think about before choosing a species or breed?
5. What other times have you had to think about a lot of things before making a decision?

**Apply:**

6. How will you make decisions in the future?

**GOING FURTHER:**

- Discuss breeds according to whether they are for egg or meat production.
- Learn more about meat-market birds like ducks, geese, turkeys or game birds.

**REFERENCES:**

*The Standard of Perfection*, American Poultry Association, 26363 S Tucker Road, Estacada, Oregon 97023

**Author:**

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# Nutritional Needs and Problems in Poultry

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The six basic nutrients and the ingredients that supply them
- The symptoms of selected nutritional deficiencies in poultry
- The causes of nutritional deficiencies

#### **ABOUT THEMSELVES:**

- Their basic nutrient needs
- The importance of eating a well-balanced diet

#### **Materials Needed:**

- Six 4 × 10-inch poster cards (nutrient cards—labeled as Water, Carbohydrates, Fats, Proteins, Minerals and Vitamins)
- One felt-tip marker
- Activity Sheet 6, Nutrient Puzzle
- Leader's Key, Activity Sheet 6, Nutrient Puzzle
- Pencils

#### **ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

The proper kinds of food are important to a bird's survival and health. The 4-H poultry project member must know which nutrients are needed for the bird's health, egg production, growth or fattening.

What is a nutrient? A nutrient is a chemical needed for life. Food contains nutrients. There are six basic nutrients for poultry. Some are needed in large amounts, while others are needed only in small amounts. Each nutrient has a different purpose for the body.

These nutrients must be included in a poultry ration to have a balanced ration.

1. **Proteins** are the building blocks of the body. They are needed to maintain health, for growth, reproduction, work and egg production.

Proteins are made of chemicals called amino acids. Amino acids contain nitrogen, carbon, hydrogen, oxygen and sometimes sulfur. When food is digested, protein is broken down into different amino acids which are carried to parts of the body in the blood. The chick requires rations which will supply 10 important amino acids.

Protein may come from either plant or animal sources.

#### **Leader Notes**

Have members list what they feel are the six basic nutrients for poultry. Check those listed against the definition.

Ask members to name a nutrient. Ask members to list or mention a basic function of each nutrient and discuss it before giving correct information.

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## Leader Notes

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2. **Carbohydrates** are the bird's major source of energy. Energy is necessary to maintain body temperature and for activity. When carbohydrates are not used by the body, they are stored in the body as fat.

The carbohydrates that are digestible by poultry are sugars and starches. The main source of these carbohydrates is grains.

3. **Fat** is also an energy source, but is only needed in small amounts because it is a very concentrated form of energy. Fat can be stored in the body for later use.
4. **Minerals** are needed in small amounts. They are needed for the growth and health of bones and for many life processes. The important minerals in poultry rations are calcium, phosphorus, magnesium, manganese, zinc, iron, copper, iodine, sodium, chlorine, potassium, sulfur, molybdenum and selenium.
5. **Vitamins** help such body functions as vision, blood clotting and bone development.

Some vitamins dissolve in the presence of fat. Some vitamins dissolve in the presence of water.

6. **Water** is the nutrient required in the greatest amount. Water cleans the body and regulates the body temperature. It carries other nutrients through the body and carries wastes out of the body. Of the six nutrients, water makes up the greatest proportion of a bird and the egg.

Usually, a chicken will drink about twice as much water by weight as food they eat. Age, body weight, production, weather and type of ration will affect how much water birds will drink. Water is found in the feed as moisture, but an additional supply of fresh water must be provided.

Pass out Nutrient Puzzle.

Check your knowledge about the poultry animal nutrients with the crossword puzzle.

Not enough feed, water or a deficiency of a nutrient can lead to problems. Here are some common ones and how to prevent them.

**Too little feed** may cause growing birds to lose weight and egg layers to stop laying. Death could result if birds do not have feed for several days.

With **too little protein**, birds will grow more slowly, start pecking each other, pull and eat their feathers, and may develop leg problems. Layers produce fewer and smaller eggs. Some hens may stop laying completely.

**Not enough water** causes birds to stop eating, lose weight and dehydrate. Layers will stop laying and lose their feathers. Without water, birds will dehydrate and die sooner than when feed is lacking.

**Mineral Deficiency**—a deficiency of calcium will result in thin eggshells, soft bones (rickets) and abnormal walking.

**Vitamin Deficiency**—a deficiency of Vitamin A in chicks may cause depressed growth, weakness and loss of coordination. If birds do not receive enough Vitamin D, they will develop leg problems, poor growth, and poor feathering.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many of the six essential nutrients can you name?
2. Which nutrient is easiest to remember? Why?

#### **Process:**

3. Which nutrient is needed most? Why?
4. Which nutrient, when missing, causes the least problems? Why?

#### **Generalize:**

5. How important are these nutrients to human diets?
6. Which nutrients are needed most by people? Why?

#### **Apply:**

7. How will you use this information to improve your diet?

### **GOING FURTHER:**

- Learn protein requirements for varying ages and types of poultry.
- Visit a feed store and compare nutrients available in different feeds.
- Conduct a research project on poultry by feeding one group more nutrients than the other.
- Give a presentation on various nutrient deficiency effects in poultry.

### **REFERENCES:**

*Poultry Science*, Ensminger

### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University; Poultry Design Team

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# NUTRITIONAL NEEDS AND PROBLEMS IN POULTRY

## POULTRY, LEVEL I

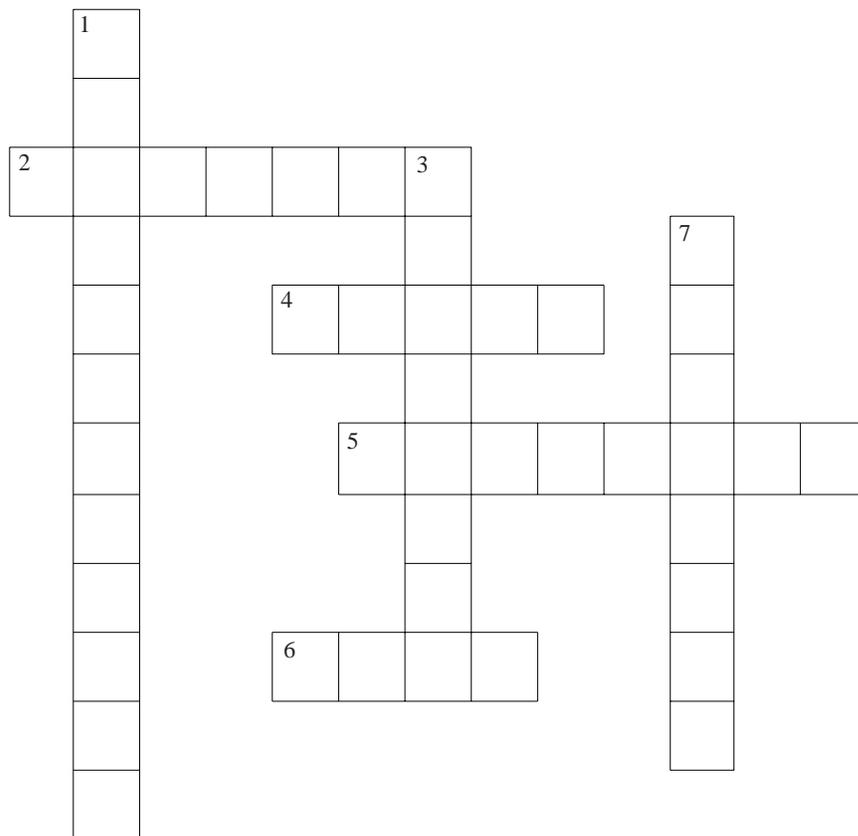
### Activity Sheet 6, Nutrient Puzzle

#### Across:

2. Nutrient required for muscle growth
4. Nutrient required in the greatest amount
5. Examples are calcium, phosphorus and iron
6. An energy source only needed in small amounts

#### Down:

1. The major energy source nutrient
3. A compound that aids in the support of life
7. Only minute amounts are required







# Is Your Bird Sick?

*Poultry, Level I*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- What a healthy bird looks like
- Five signs of illness

### ABOUT THEMSELVES:

- The importance of the senses in observation skills

## Materials Needed:

- Chalkboard or flip chart
- Activity Sheet 7, Flock Observation Sheet
- Markers or chalk
- Pencil

**ACTIVITY TIME NEEDED:** 60 MINUTES

## ACTIVITY:

## Leader Notes

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Recognizing signs of illness in a bird sounds easy, but it can be difficult. Birds tend to mask their symptoms until they are very ill. This may help them survive in the wild, as sick birds may attract predators and are usually driven out by other members of the flocks. By the time the bird actually behaves sick, it may be near death, making treatment difficult. Because diseases can spread very quickly, it is important to recognize problems in a flock early, before they get out of control.

A **healthy bird** has shiny, tight feathers, and a strong beak and claws. The eyes and nostrils are free of discharge. The feathers around the vent are clean. The breast muscles are full, and the keel bone can barely be felt. A healthy bird spends much of its day foraging for food, and likes to stay close to the flock. Normal bird droppings are green and firm, with a white cap.

**Signs of illness** include weight loss, lower egg production and lower feed intake. Other signs often include coughing, diarrhea and fever. A sick bird may isolate itself from the rest of the flock and stand with its feathers ruffled and its neck hunched up.

If you suspect your birds have an illness, contact your local veterinarian and K-State Research and Extension poultry specialist for assistance.

### Flock Observation

Visit a flock of poultry in your area. Observe the flock for several minutes. Write down all the behaviors you can identify. Are there any birds in the group that are acting differently than the rest?

In small groups, have members list how a healthy bird acts or looks. Have each group report and list on a chalkboard or flip chart. Do the same activity for signs of illness.

---

## Leader Notes

---

Look at the bird droppings. Are any of them different than described above?

Close your eyes and listen quietly to the flock. How would you describe normal flock sounds?

Hand out Flock Observation Sheets to each member. After they have observed the flock and listed behaviors and symptoms, discuss their answers.

Choose one bird from the flock and pick it up if possible. Carefully examine its feathers, eyes, nostrils, vent and breast muscles. Does it appear healthy or not?

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was the most unusual or interesting thing you saw while watching the birds?
2. What sounds did you hear while listening to the flock with your eyes closed?

#### **Process:**

3. What are some signs of a healthy bird?
4. What are signs that a bird may be sick?

#### **Generalize:**

5. What things do you see that indicate when other animals do not feel well?
6. What warning signs do you see around your home or while riding in a car that indicate possible danger?

#### **Apply:**

7. How will learning to detect signs of illness or danger help you be safe and healthy?

### **GOING FURTHER:**

- Ask a veterinarian to visit with you about bird health.
- Ask a medical doctor to speak to your group about observing signs of illness.
- Share with your classmates at school what you learned.

### REFERENCES:

#### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University; Poultry Design Team

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**IS YOUR BIRD SICK?**  
**POULTRY, LEVEL I**  
**Activity Sheet 7, Flock Observation Sheet**

What You Observed (Saw)	Check One	
	Normal	Sick
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		
13. _____		
14. _____		

**Think Back:**

What can you do to keep birds healthy? Are certain types of birds easier to keep healthy? Why or why not?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



---

# Catching and Handling Poultry

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- To catch a bird in a cage or coop, remove it, and then return it
- To hold a bird to examine for judging or culling

#### **ABOUT THEMSELVES:**

- The importance of friendships

#### **Materials needed:**

- Table and cage
- Live bird
- Wood shavings or shredded paper
- Paper or plastic to cover table

**ACTIVITY TIME NEEDED:** 30 MINUTES

#### **ACTIVITY:**

It is necessary to catch and handle birds when selecting, judging and at various times in the management of the flock. Proper catching and handling methods can prevent injury and discomfort to the birds and the persons doing the handling. By using proper procedures, members can show skills they have learned in working with poultry.

##### **Removal of bird from a cage**

Open the cage door. Reach across the bird's back; grasp the far wings; turn the bird so it faces the cage door. Slide second hand beneath the bird's body, placing one or more fingers between bird's legs and grasping them so that the bird, when lifted, can be balanced on the palm of that hand. Place your first hand on the bird's back. Remove the bird from the cage head first. Come to attention and watch the judge for further direction.

##### **Placing bird in cage**

Hold the bird in the basic hand position, open the cage door, turn the bird, put it into the cage head first, place it gently on the cage floor and close the cage door.

##### **Passing bird to another person**

The person receiving the bird should place one hand on the back of the bird and slide the other hand under the breast of the bird as the bird is passed. Always pass the bird head first.

#### **Leader Notes**

This would be an easy activity to simply demonstrate to the members and have them practice the various steps. Another method which provides greater opportunities to develop life skills as well as catching and handling skills is outlined below. You'll find that members will have additional enthusiasm and interest as you give them the opportunity to learn by doing before being told or shown how. This is sometimes referred to as a skillathon. Consider the following two skillathon situations:

**SITUATION #1:** The poultry showmanship judge has asked you to remove your bird from the cage. **YOUR TASK:** Demonstrate how you would remove the bird while the judge looks on.

**SITUATION #2:** The judge asks you to pass your bird to the person next to you. **YOUR TASK:** Demonstrate how you would safely pass the bird.

---

## Leader Notes

---

Showmanship lesson, Level II has pictures that can be used to supplement these first three handling methods.

### **Catching a small group of birds**

First, you must drive birds into a corner or small area. This can be done by using portable wire panels that have been hinged together in a series of three or more so they can be folded or expanded and still remain standing. Each panel should be about 2 feet wide by 3 or 4 feet high. Stretch the folding panels across the corner of the larger pen so there is just enough room for the birds to stand. Make sure the panels will not collapse from the weight of the birds pushing against the sides. After the birds have been driven into the smaller pen, work as fast as you can to catch the birds by grabbing them from behind by the legs and handing them over the fence to someone to put into a crate. To prevent smothering, be careful to not let the birds pile up for more than a minute.

### **Catching single birds from a flock**

Make a catching hook from stiff wire. The wire should be about 4 feet long with a handle on one end and the other end bent back on itself to form an S-shaped hook. The open end of the hook should be wide enough to allow the shank of the bird to slip through and the bottom flared just enough to allow the foot to be held. Gently pull the open end of the hook over the shank of the chicken's leg, drawing back on the hook when the shank is caught. Pull the bird toward you, grab both legs in one hand and take the foot from the hook.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Which methods of catching and handling birds have you used?
2. Which methods do you prefer? Why?

#### **Process:**

3. What are two methods of catching a bird? When would you use each method?
4. What problems did you have the first time you tried to remove a bird from a cage?
5. Why is it important to know the proper way to handle birds?

#### **Generalize:**

6. How important is it to be kind to people?
7. What are some things you do to show your friends you care or value their friendship?

#### **Apply:**

8. How do you expect your friends to treat you? Why?

**REFERENCES:**

*Catching and Handling Poultry*, Agriculture Extension Service, University of Minnesota

*Handbook of Livestock Management Techniques*, Richard A. Battaglia and Vernon B. Mayrose, Burgess Publishing Company

**Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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# Washing That Bird

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The importance of exhibiting clean and parasite-free birds
- Show how to properly clean and groom a bird for show

#### **ABOUT THEMSELVES:**

- Their feelings about the importance of teamwork

### Materials Needed:

- Three tubs or large containers of warm water
- Detergent or mild soap
- A sponge or soft brush
- Old towels or soft cloths
- Petroleum jelly, mineral oil or a similar type of oil
- Clean coops or cages
- Several birds
- Sevin or Malathion and a shaker can

### ACTIVITY TIME NEEDED: 60 MINUTES

### ACTIVITY:

### Leader Notes

---

Poultry for exhibit should be clean and free of external parasites, which are tiny bugs like lice and mites that sometimes live on the outside of a chicken's body. Dirty birds are a reflection on the exhibitor and will most likely be graded down during judging. White-feathered birds especially need to be washed to have a clean appearance. Non-white feathered birds and waterfowl may only need their shanks and feet washed and some cleaning about the head with a damp cloth.

Not all poultry exhibitors use the same procedure in preparing their birds for show. More experienced members in the club may be familiar with a washing procedure. The following is a suggested procedure:

1. Use a warm (about 80 to 85°F), draft-free room for washing and drying the birds. Birds should dry slowly for best results. Use a heat lamp if a warm area is not available.
2. Use three tubs of water; work up a good batch of suds in the first tub and use the second and third tubs for rinse water. The wash water should be warm to the touch and the rinse water slightly cooler to aid in removal of the soap.
3. When washing the bird, rest the bird on the palm of one hand and restrain the bird with the other hand held over the back of the bird.

Obtain the necessary supplies prior to the meeting.

Divide the group into teams of two or three members each. Provide each team with a bird and access to the supplies.

---

## Leader Notes

---

Demonstrate step by step how to wash and groom a bird. An older, experienced member or a local exhibitor could be used as a demonstrator.

4. The feathers must be soaked well or they may break.
5. Wash the feathers thoroughly, with the grain, using your hand or a sponge.
6. Rinse with lukewarm water by moving the bird back and forth through the water. After removing the bird from the water, press as much water as possible from the feathers. Repeat the procedure after each rinse. Be sure there is no soap left on the feathers.
7. Press (don't rub) dry the birds with a towel or cloth and place them in a clean coop or cage in a warm room until they are completely dry.
8. Check the birds for lice and mites and treat if infested.
9. Just prior to judging, check the birds over for soiled spots that can be removed with a damp cloth. Clean the shanks and toes with a brush. A toothpick can be used to clean around the toes and under the shanks. Rub a small amount of mineral oil or petroleum jelly on the shanks, feet, beak, comb and wattles. This will give these areas a polished appearance.

Nothing gives a judge a more negative attitude about an entry than the presence of external parasites. Thus, the birds should be examined for the presence of external parasites several days prior to the show. The most common external parasite found on show birds is the common body louse. This parasite is visible to the naked eye. Body color varies from gray to yellow to black. They live on the bird, feed on dry scales and feathers and get moisture from the vent. The most obvious signs of an infestation are the movement of the lice in the vent area of the bird, and the presence of clusters of eggs (nits) on the feathers around the vent. If lice are present, dust each bird individually, particularly around the vent, with an insecticide such as Sevin or Malathion. For a small flock, providing a dust box with insecticide, is a good control practice.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What happened when you soaked the bird in warm water?
2. What was the most difficult part of washing a bird? Why?

#### **Process:**

3. Why is it important to have a warm room and warm water for washing a bird?
4. What is significant about checking for lice or mites on a bird?
5. What part of the bird is most likely to have lice? Why?

**Generalize:**

6. What is different when washing a bird as compared to other animals?
7. What did you learn about teamwork?

**Apply:**

8. What other jobs do you do that require help?
9. When is teamwork important for other things that you do in your project group or club?

**GOING FURTHER:**

- Give a demonstration to club members on how to prepare a bird for show.

**REFERENCES:**

*Poultry - Washing Your Project Bird*, University of Minnesota 4-H Animal Science, Poultry Project Meeting Guide, AS-45.

*A Guide in Selecting and Preparing Poultry for Show*, K-State Research & Extension L-771.

**Author:**

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# Why Do We Raise Poultry?

## *Poultry, Level I*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Five eggs or egg products
- Price differences in size and grade of eggs
- Three companies that distribute poultry meat products

#### **ABOUT THEMSELVES:**

- How they can learn at the grocery store
- Their ability to check prices and compare items

#### **Materials Needed:**

- Activity Sheet 8, Store Search
- Clipboard or something to write on
- Pencil

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

We raise poultry mainly for food. Poultry products can be seen in stores as eggs and egg products or as meat and meat products.

Today, we are going to the local grocery store to see how many egg and egg products we can find. Be sure to check the price differences between different sizes and grades of eggs. See how many company or brand names you can find. Do the same thing with poultry meats.

#### **Leader Notes**

Divide members into groups of two or three and let them find and list products on the Activity Sheet 8, Store Search. You may need several copies per member.

Be sure to spend some time reviewing and discussing Store Search Activity Sheet.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many different items did you find?
2. Were there more eggs or meat products?

#### **Process:**

3. What differences in prices did you find?
4. What did you learn about egg prices that might help you understand other items?
5. What affect did packaging have on price?

#### **Generalize:**

6. What did you learn about comparison shopping?
7. How will this lesson prepare you for other purchases?

#### **Apply:**

8. What will you do differently the next time you go shopping?

### **GOING FURTHER:**

- Visit someone who sells eggs to see how they size or grade their eggs.
- Visit or ask a poultry products company to send you information about their products.

### **REFERENCES:**

#### **Author:**

Dr. Sam Varghese, Extension Specialist, Department of Animal Science, Michigan State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

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**Think Back:**

What do you remember most about catching, handling or washing a bird?

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What is your favorite poultry food? Why?

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# Kansas 4-H Poultry Leader Notebook

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# Setting Goals for Your 4-H Poultry Project

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- How to set goals

#### **ABOUT THEMSELVES:**

- Importance of setting goals

#### **Materials Needed:**

- Paper and pencils
- Poultry Member Guide and Annual Report (MG-26)

**ACTIVITY TIME NEEDED:** 30 MINUTES

#### **ACTIVITY:**

Goals should indicate growth in the project as well as the member's learning. Each year the goals should include at least one new skill to learn.

The MAP Worksheet defines the steps members must go through to set their goals for Level II.

#### **Leader Notes**

Have each member tell what goals he or she met or accomplished during the last year in this project. For example: raised 50 day-old chicks, gave a project talk on pigeons, etc.

Hand out Poultry Member Guide and Annual Report to each member.

Ask the members for some suggestions of things they might want to learn during the project year. Possible ideas might be suggested from lesson titles in Level II.

After they have developed a good list, have the members write their goals for the year on their MAP.

Have the members share their goals for the year with each other and the group. With these goals in mind, you can plan the project meetings so the members will be able to accomplish many of their goals.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What is one skill you learned from your poultry project last year?
2. What is the goal you have for your poultry project this year?

#### **Process:**

3. What problems did you have with your poultry project last year?
4. Why do you think you had those particular problems?

#### **Generalize:**

5. Does setting goals help you solve poultry problems?
6. Does setting goals help you solve your own problems?

#### **Apply:**

7. How will you use goal setting the next time you plan an activity?

### **REFERENCES:**

#### **Author:**

James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Poultry Design Team

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# SETTING GOALS FOR YOUR 4-H POULTRY PROJECT

## POULTRY, LEVEL II

### Poultry Member Guide and Annual Report

Welcome to the 4-H Poultry Project! The purpose of this Poultry Member Guide and Annual Report is to help you journey through your Poultry Project. This guide will:

- Identify how to set goals on things to learn and begin your project,
- Identify 4-H learning opportunities,
- Identify 4-H recognition system,
- Provide you with an annual summary for your Kansas 4-H Poultry Project.

#### EXAMPLES OF GOALS ON THINGS TO LEARN

- Level I - Identify five poultry breeds
- Level I - How to catch and handle a bird
- Level II - The parts on an egg
- Level II - Types of feathers and their functions
- Level III - How to raise day-old chicks
- Level III - Effect of light on egg production
- Level IV - Stages of chick embryo development
- Level IV - The potential of five poultry careers

In addition, there is a note to your parents/guardian at the bottom of this page, so they can help you with your poultry project.

#### LEARNING OPPORTUNITIES IN 4-H

- Attending project meetings with your friends
- Learning record-keeping skills
- Giving presentations at club and county 4-H Days, State Fair, school or civic groups
- Attending judging clinics and contests to observe, evaluate and make decisions
- Exhibiting at local, county, state or at American Poultry Association sanctioned shows

#### 4-H RECOGNITION SYSTEM

4-H's Recognition System is diverse and provides you with many learning opportunities:

- Participation: attending project meetings, helping others at project meetings, show and share at State Fair
- Progress toward goals: meeting the deadlines you set on your MAP sheet (see page 2)
- Standards of excellence: meeting a high percentage of learning goals for each level of the project
- Peer competition: judging and showmanship contests at poultry shows and fairs
- Team/cooperative efforts: community service activities

#### NOTES TO PARENTS/GUARDIANS:

The Poultry Project is one of several projects in the Animal Sciences Division of Kansas 4-H projects. It is an ideal project for both rural and urban youth, as well as all age groups. Poultry is a good beginning project because it requires minimal investment and teaches responsibility.

If your youth does not have a group leader, check with your local K-State Research and Extension office to see if your youth can participate in a neighboring club. If this is not available, you will need to act as the leader or helper. The K-State Research and Extension office has a copy of the "Poultry Leader's Notebook" you may wish to use.

Insert all member handouts and activity sheets in the 4-H Record Book after this Poultry Member Guide and Annual Report. These records are a recording of what was done. List costs, hours spent, etc., on your journal page created in MAP STEP 8. Financial and performance records may be found in: Level II pages 65 to 70; Level III pages 21 to 26, 33 to 42, 53 to 60 and 74 to 84. Using records before the youth is capable of understanding the concept or doing the math computations is strongly discouraged!

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## HOW TO SET GOALS AND BEGIN YOUR PROJECT USING THE MEMBER ACHIEVEMENT PLAN—MAP

This is your **Member Achievement Plan—MAP**. This plan will help you begin to decide what goals, deadlines and energizers you want to use for the upcoming year.

### MAP STEP 1

Identify as goals two things you would like to learn this year. Your leader will give you a list that might help you think about what you want to learn in your poultry project.

Goal 1: \_\_\_\_\_

Goal 2: \_\_\_\_\_

### MAP STEP 2

After you identify each goal, let's break them into steps. You can list 3 to 5 steps for each one of your goals.

Steps for Goal 1:	MAP STEP 3 Deadline	MAP STEP 4 Energizer	MAP STEP 5 Date Completed
1st _____	_____	_____	_____
2nd _____	_____	_____	_____
3rd _____	_____	_____	_____
4th _____	_____	_____	_____
5th _____	_____	_____	_____

### MAP STEP 3

Now that you've put Goal 1 into steps, go back and put a deadline next to each step. The deadline shows when you plan to complete the step. Every step should have a different deadline or date.

### MAP STEP 4

Sometimes goals are hard to stick to. It takes a long time to see results. So as you complete a step and meet a deadline you need to give yourself a boost. Let's call this boost an energizer or reinforcer. An energizer can be anything that you like and enjoy: going to a movie with a friend, talking on the phone, listening to a CD, taking your dog for a walk, eating a healthy snack, playing ball, etc.

What are other things you might use as energizers? List them here: \_\_\_\_\_

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Now, place one energizer for each step under the column marked, "Energizer."

### MAP STEP 5

When you've finished a step in your goal, place the date completed in the column marked, "Date Completed."

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### MAP STEP 6

Now that you've identified your steps, deadlines and energizers, do the same for Goal 2.

Steps for Goal 2:	MAP STEP 3 Deadline	MAP STEP 4 Energizer	MAP STEP 5 Date Completed
1st _____	_____	_____	_____
2nd _____	_____	_____	_____
3rd _____	_____	_____	_____
4th _____	_____	_____	_____
5th _____	_____	_____	_____

### MAP STEP 7

Your goals, steps, deadlines and energizers are written. It's time to share with one of your project members. When we talk to others about our goals, it helps us get a better idea of what we are going to do. Sometimes talking will help us get a better idea, so don't worry about changing any part of your MAP if you want to. After you've explained your goal to a project friend, have them sign and date it in the space provided below.

Project Friend's Signature \_\_\_\_\_ Date \_\_\_\_\_

Have your project leader sign below:

Project Leader's Signature \_\_\_\_\_ Date \_\_\_\_\_

### MAP STEP 8

Keep a journal of everything you do in the project to help you remember these experiences. (Create a page with these headings and add it to this record.)

Date	What you did, learned, how you felt, costs, time spent, etc.
Ex. Nov 5	Attended a project meeting and learned parts of a bird. Now I know why a bird can fly so easily.
Mar. 6	Spent 10 hours building an incubator at a cost of \$25.

### MAP STEP 9

You've spent a whole year on your poultry project. You should have learned many new things. Take some time to think back and review your journal (STEP 8). Write one or two main things you have learned about poultry. What is something you have learned about yourself while studying poultry? (Add a page if you need more space.)

Year \_\_\_\_\_  
**Kansas 4-H Poultry Summary**

Name of project \_\_\_\_\_ Type of bird to exhibit \_\_\_\_\_  
 Name \_\_\_\_\_ Age \_\_\_\_\_ Years in 4-H \_\_\_\_\_  
 4-H Club \_\_\_\_\_ County \_\_\_\_\_

1. Breed(s) \_\_\_\_\_
2. Date project started \_\_\_\_\_ 3. Date project ended \_\_\_\_\_
4. Total value or money received (column 2) \_\_\_\_\_ \$
5. Value of birds at beginning (column 1) \_\_\_\_\_ \$
6. Total feed cost \_\_\_\_\_ \$
7. Other expenses (including birds bought during the year) \_\_\_\_\_ \$
8. Total expenses (add lines 5, 6, 7) \_\_\_\_\_ \$
9. Net income or loss from project (line 4 minus line 8) \_\_\_\_\_ \$
10. A. Number of birds started \_\_\_\_\_  
 B. Number of birds raised \_\_\_\_\_  
 C. Number of birds that died \_\_\_\_\_
11. Percent death loss (line 10c divided by line 10a × 100) \_\_\_\_\_ %

Value of Birds at Beginning of 4-H Year			Value of Birds at Close of 4-H Year		
	Number	Value		Number	Value
Chickens		\$	Chickens		\$
Turkeys			Turkeys		
Pigeons			Pigeons		
Waterfowl			Waterfowl		
<b>TOTAL</b>		\$	<b>TOTAL</b>		\$
(column number)		(1)			(2)

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MG-26 (Revised)

May 1998

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File code: 4-H Youth-2



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# Identifying Poultry Feed Ingredients

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT

- Six nutrient classes of feed ingredients
- Feed ingredient examples of each nutrient class

#### ABOUT THEMSELVES

- The nutrient classes included most in their diet
- The nutrient classes for their favorite foods

#### Materials Needed:

- Broiler starter feed sample (not pelleted or crumbled)
- Broiler starter feed sample (pelleted and crumbled)
- Activity Sheet 1, Poultry Feeds

**ACTIVITY TIME NEEDED:** 30 MINUTES

#### ACTIVITY:

#### Leader Notes

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The **feed ingredients** in a poultry ration are classified into one of six nutrient classes according to their function and chemical make-up. The classes are **carbohydrates, fats, proteins, vitamins, minerals** and **water**.

**Carbohydrates** are found in corn, milo, wheat and oats. You may find any one or all of these grains in a ration. **Fats** are used to supply energy and are usually used in the form of animal fats and vegetable oils. It is hard to see fat in a ration; however, the more fat that is used the less dusty the ration will be.

**Proteins** are used for muscle development and come from soybean meal, fish meal, meat by-products and corn gluten meal. **Vitamins** are found in alfalfa meal, yellow corn, and animal by-products. You should be able to find some of these ingredients in your ration. The best source of vitamins is a commercial vitamin premix and this will be hard to find in the ration. **Minerals** such as calcium and phosphorus are supplied by oyster shell, ground limestone and dicalcium phosphate. You may be able to see these products in the ration. Trace minerals are found in a commercial mineral premix and cannot be easily seen in the ration.

Many commercial feeds are pelleted by a pressure and steam process. This will alter the appearance of the ration. Crumbled rations are pellets that have been broken into small pieces. Pelleting or crumbling a ration may help the bird consume a more balanced diet and reduce feed wastage.

Have two or three members examine a mixed broiler starter feed sample. Have them separate ingredients they can identify. List the ingredient and nutrient class on the Poultry Feed activity sheet. To see how processing can affect the structure of an ingredient, compare a ground ration to a crumbled or pelleted ration.

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## Leader Notes

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Have members do the Ingredient—  
Nutrient Class match on Activity Sheet 1,  
Poultry Feeds, as a review.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many different ingredients did you find?
2. How many nutrient classes were in your feed sample?

#### **Process:**

3. What were the differences between pelleted or crumbled samples?
4. What ingredients are grown in your community?

#### **Generalize:**

5. What nutrient classes are most common in your diet?
6. What foods do you eat that represent each nutrient class?

#### **Apply:**

7. How will your eating habits change, based on what you have learned in this lesson?

### **GOING FURTHER:**

- Give a presentation to your class or other groups about the similarities of poultry feeds and human foods.

### **REFERENCES:**

*Feeding the Small Flock of Poultry*, K-State Research & Extension C-392  
(Revised)

#### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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Poultry Leaders Notebook, Kansas State University, May 1998.

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**IDENTIFYING POULTRY FEED INGREDIENTS**  
**POULTRY, LEVEL II**  
**Activity Sheet 1, Poultry Feeds**

List the feed ingredients and their nutrient class you were able to identify from the feed sample provided by your leader.

Ingredients	Nutrient Class
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Match the following ingredients by drawing a line to the correct nutrient class.

<b>Ingredients</b>	<b>Nutrient Class</b>
Phosphorus	Carbohydrates
Corn	Fats
Soybean meal	Proteins
B	Vitamins
Milo	Minerals
Alfalfa meal	Water
Wheat	
Fish meal	
Oats	
A	
Calcium	
H <sub>2</sub> O	





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# How to Read Feed Tags

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Ingredients listed on a feed tag
- To identify types of information found on a feed tag
- To identify feed tag ingredients as sources of energy, protein, mineral or vitamin

#### **ABOUT THEMSELVES:**

- Nutrients needed for humans are similar to those needed for poultry
- It is their responsibility to eat a balanced diet

#### **Materials Needed:**

- Activity Sheet 2, Cereal Box Feed Tag Quiz
- Several examples of feed tags (you may have some of your own from purchased feed or these can be acquired from your local feed dealer)
- Pencils and paper
- Samples of some common feeds—you can ask members to bring a sample of what they feed with the tag from the feed sack (best if it is in a plastic bag or a jar)
- Hand out some sample feed tags
- Flip chart or chalkboard
- Several boxes of breakfast cereals

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

Understanding the information written on the feed tag will help a member identify the ingredients of the specific feed, understand the nutrient requirements of a bird and eventually learn how to balance a ration. During our entire life we must read labels to gather information that will be helpful in our decision-making process. Poultry feed tags have some of this type of information. Thus, it is a good practice to learn to read these labels.

Proper nutrition is the key to a successful poultry flock. In the same way, if we don't get the proper nutrition by eating right, we can have health problems, our growth and development may be negatively affected, and we could die. Poultry also require proper nutrition for growth and development.

The main ingredients in poultry feeds are cereal grains (corn, wheat, barley and milo), oil meals (soybean, sunflower and cotton seed), fish

#### **Leader Notes**

Since a knowledge of feed constituents is necessary to this lesson, it is recommended that you conduct the lesson on feed ingredients before teaching this lesson.

Review the major concepts before starting this lesson.

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## Leader Notes

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meal, packing house by-products and dried-milk products. These ingredients are high in energy, low in fiber and highly digestible.

Regardless of feed type, all feeds include six basic nutrients: protein, carbohydrates, fats, minerals, vitamins and water. Knowing what combination of these nutrients your feed supplies is critical to a good feeding program.

**Protein** supplies the materials necessary to make body tissues. They are the building blocks of which chickens are made. Protein makes up muscle, internal organs, bones and blood. They also make up the skin and feathers of birds. If you feed more protein to your chickens than they need, the extra protein is used as energy for body functions such as heating or cooling the body, or producing eggs. Grains such as corn, wheat and milo supply part of the protein needed for growth. Protein supplements such as soybean meal are used to balance the ration.

**Carbohydrates** and **fats** supply energy. These nutrients are to poultry what gasoline is to a car. They provide energy for movement: walking, breathing, heartbeat and so on. These nutrients also help the bird produce heat to keep warm. Energy fed in excess of a bird's requirements is stored as fat until the body needs it.

**Minerals** build bones and support other life functions. Calcium and phosphorous make up the largest percentage of the minerals needed by a bird. Minerals that are needed in only very small amounts are called *trace minerals*. Calcium and phosphorus are usually added to the ration for growth of bones and egg shell formation. Many producers use calcium carbonate, bone meal, oyster shells or dicalcium phosphate as feed additives to supply these necessary minerals. Sodium, chlorine and iodine are also critical minerals that are usually added in the form of iodized salt. Trace mineralized salt also has a number of the minor minerals needed for proper nutrition.

**Vitamins** are just as important as other feed nutrients, but they are needed in smaller amounts. Vitamin A is required for the health of eyes, nasal passages and lungs. For strong bones and healthy blood, vitamin D is needed. Vitamins are also required for other body functions. The bird's body produces some vitamins while others must be added to the ration or absorbed from sunlight (like vitamin D3).

**Water** is considered to be the most important part of the bird's diet. Moreover, it is the cheapest part of the diet, but it is often the most neglected part, too. A bird's body is over two-thirds water and blood is over 90 percent water. Water is also necessary in digestion and for carrying food nutrients to the rest of the body. Water carries away waste products through the urine, functions as the body's built-in cooling system, and lubricates the joints. Your bird can live longer without feed than without water.

In addition to the six nutrients, most rations also contain **feed additives**. These additives are primarily put in the feed to prevent or control diseases and parasites. The addition of additives to feed is regulated by the Food and Drug Administration.

Most states require that a feed tag be attached to each bag of feed. This tag usually contains the following minimum information: net weight; guaranteed analysis for crude protein, crude fat and crude fiber; a list of the ingredients; any active ingredients, such as drugs, and their function in the feed; instructions on feeding; and any warnings, such as to discontinue use five days before slaughter.

Have you ever thought about what goes into prepared poultry feeds? Let's look at these samples of feed and the tag from each feed. The tag is an important tool for us—it tells us what is in the feed.

When you study the samples, answer these questions:

- What kind of poultry is this feed meant for?
- What are some of the major ingredients in the feed?
- What are the sources of protein, energy, vitamins and minerals in this feed?
- Why are some feeds medicated?

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. If you have feed tags (labels) from different companies, how do they differ and how are they alike?
2. Why are some grains not listed by name on the feed tag?

#### **Process:**

3. Can you tell from the feed tag if the feed contains the necessary nutrients?
4. Why is it important labels (tags) carry the contents of a package?

#### **Generalize:**

5. Why should you read the labels of the foods you purchase?
6. How can labels help you make wise food purchases in the supermarket?

#### **Apply:**

7. If your diet was restricted from using an ingredient such as salt or sodium, how would labels be useful to you?

Arrange the feed samples on a table so all of the members can gather around it, or divide the group into pairs and give each pair a feed sample and feed tag. This approach of providing a situation and asking your members to come up with answers or a solution is an effective way to teach this kind of material. After you have given the groups time to work on their questions, bring them together and let them tell the rest of the members what they have learned. Let them do the talking. Ask questions, but don't give them the answers. Once all groups have had an opportunity to give their explanations, use a different feed tag to help them understand how to read the information that is included. Be sure to refer back to some of the good points each group made and also be sure to correct some inaccuracies they might have made.

Provide cereal boxes, the question sheet and pencils. Then briefly examine the cereal box labels together. Look for the requested information and when everyone is done, compare the cereals represented for nutritional value. Repeat this activity with a feed tag from the animal feed and compare it with the cereal box exercise.

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### **GOING FURTHER:**

- Arrange a trip to a local feed mill to see how the feed ingredients are weighed and mixed together to make the complete ration.
- Have the members collect samples of different ingredients that are found in a ration and find out as much as possible about the preparation of these ingredients before they are put into the ration.
- Divide the group into teams and have each team compare two feed tags from different species or different age groups within the same species. Have them identify what kind of feed it is.
- Have members make lists of essential nutrients found on the feed tag.
- Compare the ingredients in the ration with the ingredients or nutrients found in some of our human rations such as breakfast cereals.

### **REFERENCES:**

#### **Author:**

Adapted from *Animal Science Project Meeting Guides*, Dr. Thomas D. Zurcher, University of Minnesota, 1981, by James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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## HOW TO READ FEED TAGS

### POULTRY, LEVEL II

#### Activity Sheet 2, Cereal Box/Feed Tag Quiz

Cereals are required to include nutrition information on the box. The label includes a list of ingredients that are listed in order from most to least. It also lists percentages of recommended daily allowances and the amounts of some nutrients per serving.

1. Name of cereal
2. Main ingredient
3. Serving size \_\_\_\_\_ servings per package \_\_\_\_\_
4. What does U.S. RDA mean?
5. Which vitamins are listed?
6. Does this cereal provide all of your daily needs (100%) for any of the nutrients? If so, which.
7. Which nutrients increase when milk is added?
8. Which nutrients are minerals?
9. Do the ingredients include BHA or BHT? If so, why?
10. Repeat this exercise using a poultry feed tag. Compare and discuss the answers.

**Think Back:**

What are the main feed ingredients for poultry and what nutrients do they provide?

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# Boney Birds

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The major parts of a bird's skeleton
- The function of three to five major skeletal parts
- How a bird's skeleton is adapted for flight

#### ABOUT THEMSELVES:

- Boney parts birds and mammals have in common
- How knowledge of birds helped humans develop airplanes

#### Materials Needed:

- Large sheet of paper
- Marking pens
- Activity Sheet 3, Bird Skeleton
- Leader's Key, Activity Sheet 3, Bird Skeleton

#### ACTIVITY TIME NEEDED: 45 MINUTES

#### ACTIVITY:

What are some observations you can make when you see a chicken or other type of bird? What are some skeletal similarities you see between birds and mammals? What are some differences?

Poultry are **bipeds**. That means they stand and walk on two legs, just as humans do. What other animals walk on two legs? If we look at the skeleton of a bird we would see it is similar to that of most mammals (with a few exceptions). The first difference is a bird has a pair of extra bones in the shoulder area, called the **caracoids**. These bones allow the wings to move and provide additional support for the wings. The second difference is in the spine. The neck bones, or cervical vertebrae, which connect the body to the head are formed in an S-shape. This S-shape acts as a spring when a bird lands on the ground and provides a cushion to the head. The third difference between the skeletal structure of a bird and mammals is the back vertebrae are very strong because they are fused together, providing a strong support for the wings.

The skeletal system is closely connected to the respiratory system. Some of the bird's bones are hollow and are connected to the respiratory system. Those bones serve as a reservoir for air. This makes the bird lightweight for flight. These hollow bones are called **pneumatic** bones. Pneumatic bones in the bird include the skull, humerus, keel, clavicle and lumbar and sacral vertebrae. If necessary, a bird could breathe through an open bone if its air supply was cut off to its trachea, or windpipe.

#### Leader Notes

Write down their answers on a chalkboard or large sheet of paper. Have members discuss structural similarities and differences between poultry and mammals.

List and discuss three main skeletal differences of birds as compared to mammals.

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## Leader Notes

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Other functions of the skeleton include attachment of muscles, protection of the vital organs and a source of red blood cells. Egg-laying hens also have **medullary** bones. The marrow cavity of these bones, which include the femur, tibia, sternum, ribs and scapula, contain the honeycomb lacing of bone spicules or tiny spikes, that provide a source of calcium which the hen uses to calcify shells. This type of bone is usually absent in males or nonlaying females.

The **mandible** and **incisive** bones make up the beak of the chicken and turkey or the bill in waterfowl. The shape of the beak or bill is influenced by the bird's natural diet. Chickens and turkeys have a long, pointed beak which allows them to obtain their natural diet of seeds and insects. The wing of a bird consists of the **humerus, radius, ulna, metacarpus** and **phalanges** bones. The phalanges and metacarpus bones are similar to the fingers and wrist bones in humans. The **clavicle** is the well-known wish bone. The **sternum** or breast bone is the largest bone in the fowl. Waterfowl have a much larger and flatter sternum than chickens and turkeys, as it provides protection to the vital organs when waterfowl land on water. The **vertebrae** from the base of the neck to the base of the tail are fused with the **ilium** and **ischium** to provide rigidity to the skeleton for flight. Because the egg passes between the two pubic bones which are located below the vent of the bird, the distance between them is used as an indicator of egg production. The **femur, fibula, tibia** and **metatarsus** bones make up the leg of the bird. The metatarsus bones are comparable to the ankle bones in humans. Most breeds or varieties of chickens and turkeys have four toes, a few have five. The shape and structure of the feet and toes of birds depends on their natural diet. For example, grain eaters, such as chickens and turkeys, have long sharp toes for scratching the soil for seeds and insects. Waterfowl, such as ducks and geese, have webbed feet for paddling in the water. Most species of birds have seven pair of ribs. The ribs are flexible because they expand and contract as the bird breathes.

Hand out Activity Sheet 3, Bird Skeleton.  
List similarities of bird and human skeletons on a chalkboard or newsprint.

Let's take a look at the bird's skeleton and see how many parts we can identify. How many bones do you think are the same as yours?

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What bird skeleton parts did you already know? Why?
2. What bird skeleton parts were hard to identify? Why?

#### **Process:**

3. What are pneumatic bones and what do they do?
4. What are medullary bones? List some.
5. How is a bird's skeleton adapted for landing purposes?

### Generalize:

6. How does the skeletal structure of a bird differ from that of mammals?

### Apply:

7. What bird characteristics do you think were important in helping to develop the airplane?
8. How will what you learned from this lesson help you in the future?

### GOING FURTHER:

- Make a poster of a bird's skeleton and give a talk at your next club, project meeting or in your class at school.
- Save the bones from the chicken your family eats and identify them.

### REFERENCES:

*Poultry Science*, Ensminger

*Poultry Meat and Egg Production*, Parkhurst

### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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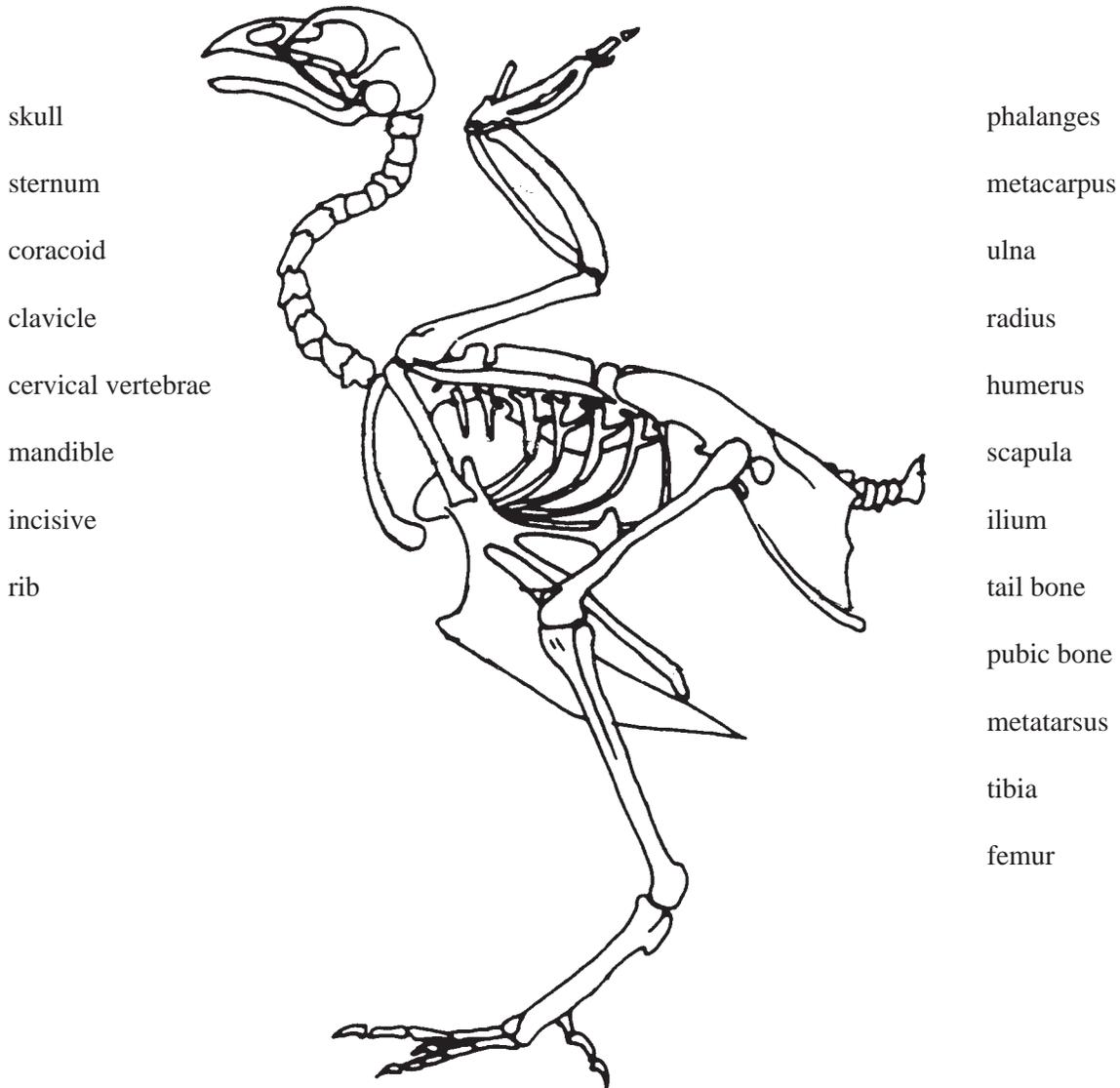
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**BONEY BIRDS**  
**POULTRY, LEVEL II**  
**Activity Sheet 3, Bird Skeleton**

Draw a line from the name of the bone to the correct place on the diagram.

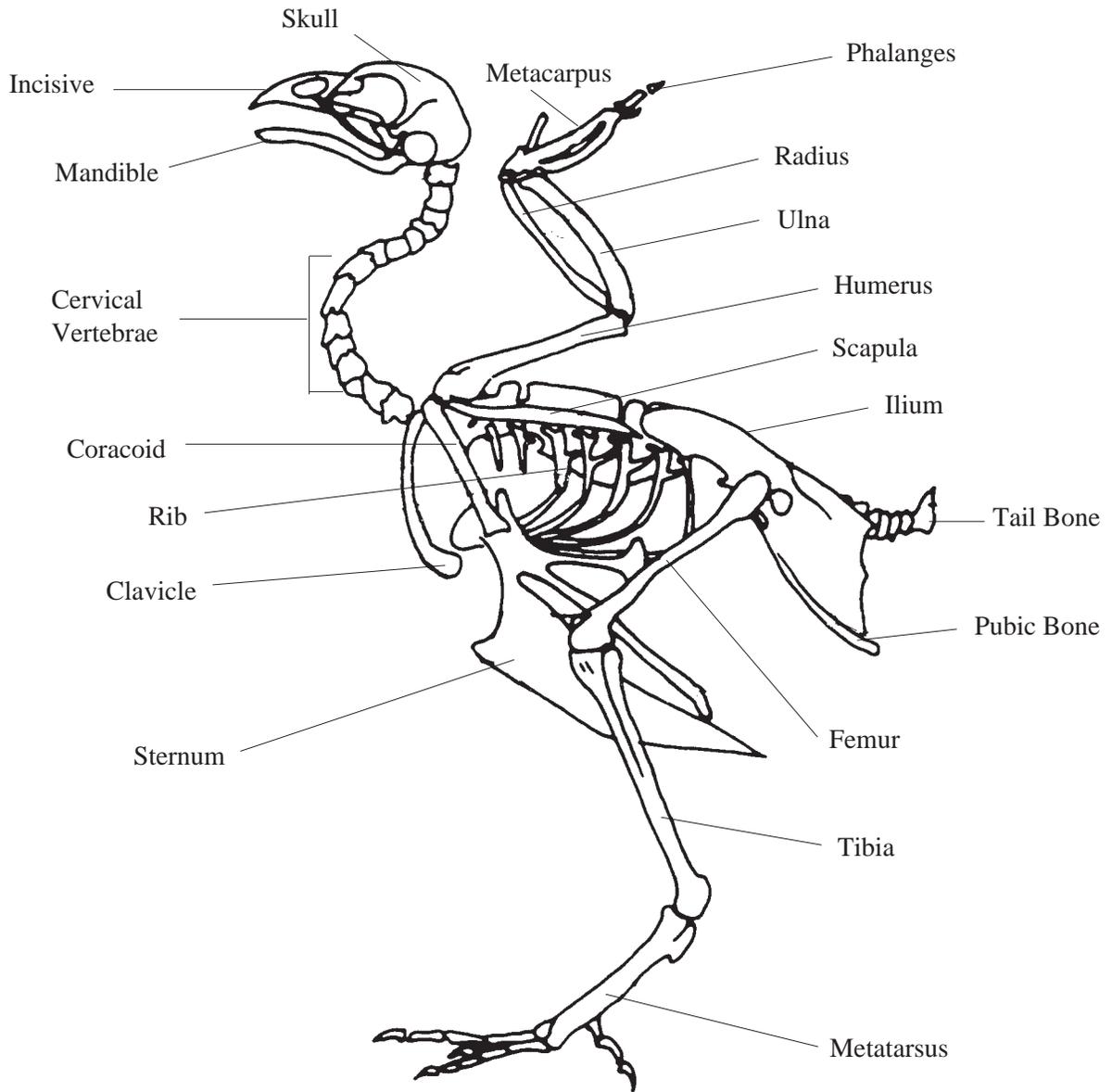


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**BONEY BIRDS**  
**POULTRY, LEVEL II**  
**Leader's Key, Activity Sheet 3, Bird Skeleton**

Draw a line from the name of the bone to the correct place on the diagram.







# A Chicken's Digestive System

*Poultry, Level II*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- The four functions of a chicken's digestive system
- To identify at least eight parts of the chicken's digestive system
- The eight functions of each major part of the digestive tract

### ABOUT THEMSELVES:

- The importance of their digestive system
- How food choices affect their digestive system

### Materials Needed:

- Chalkboard or newsprint
- Markers
- Activity Sheet 4, Digestive Tract
- Leader's Key, Activity Sheet 4, Digestive Tract
- Activity Sheet 5, Digestive System Word Search
- Leader's Key, Activity Sheet 5, Digestive System Word Search

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

The **digestive system** consists of the parts of the body which are involved in the chewing and digesting of feed. This system is also responsible for moving the digested food particles through the chicken's body and absorbing the products of digestion. Chickens have certain special organs that are not found in other animals.

Functions of the chicken's digestive system are to get the food into its mouth with its beak or bill (**prehension**), storage of the food (in the crop) until it can be digested, physical breaking down of the food particles by the gizzard (**mastication**), chemical breaking down of the food nutrients into the simple forms (**digestion**), passage of the simple forms across the intestinal wall to the blood vessels (**absorption**) and storage and elimination of the wastes.

The structure and length of the digestive tract of an organism is determined by what type of food it eats. Meat and grain eaters (**omnivores**), such as birds, dogs, cats and humans, have shorter digestive tracts than cattle or sheep, which are **herbivores**, animals that eat complex plant materials. For example, the length of the bird's digestive tract is approximately four times longer than its body. The digestive tract of a sheep measures approximately 27 times its body length. The longer tract is necessary to allow a longer time for digestion to take place.

### Leader Notes

List functions and other terms on chalkboard or newsprint. See if members can define or explain the terms by working in small groups before discussing them in general.

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## Leader Notes

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Hand out Activity Sheet 4, Digestive Tract. See how many of the parts members can label in pencil. Then, as you use the text to discuss the parts, let members correct their sheets, or take up the sheets and give back them after discussion as a post-test.

Chickens, like humans, are a **monogastric**, which means they have a simple stomach. Cattle and sheep are **polygastric**, or ruminants, because they have four stomachs.

The major parts of a chicken's digestive system and their functions are:

1. **Mouth**—The prehension or acquiring of food by birds differs from mammals because birds do not have teeth, lips or cheeks. The shape of the bird's beak or bill is related to the type of food it eats (for example chickens and turkeys have pointed beaks because they are grain eaters.) A chicken's tongue is pointed with barb-like projections on the back and hard projections on the roof of the mouth, which serve to force the food toward the gullet (or esophagus) of the bird.
2. **Gullet (or esophagus)**—The gullet is a flexible tube, next to the windpipe, which connects the mouth to the crop. (Like a human's throat.)
3. **Crop**—This is the first storage site for the feed that is eaten. The crop stores and softens the food. The time food spends in the crop depends on the type of food and how much food is in the gizzard. Whole grain is kept in the crop longer than ground grain.
4. **Glandular Stomach**—The glandular stomach or proventriculus is the segment which contains cells that secrete, or give out, digestive juices that start the chemical breakdown of the food particles.
5. **Gizzard**—The gizzard serves as the bird's teeth to grind the food. It is composed of a thick, powerful muscle and is lined with a thick, tough lining. Birds eat small rocks or pebbles called grit that they use to grind the food.
6. **Small Intestine**—The small intestine is a section that extends from the gizzard to the junction with two blind pouches, called the **ceca**. The first section is the duodenal loop that surrounds the **pancreas**. The pancreas secretes insulin which regulates how the body uses sugar. It also secretes pancreatic juice that aids in the digestion of fat, starches and protein. The main functions of the small intestine are secretion of digestive juices and absorption of nutrients.
7. **Ceca**—The two ceca, sometimes called blind guts, mark the junction of the small and large intestines. Even though a chicken can live without its ceca, some digestion takes place here. The ceca is a favorite site for multiplication of parasites such as cecal worms and protozoa, like the blackhead organism.
8. **Large Intestine**—The large intestine is very short in birds and its major functions are to reabsorb water and store waste materials.

9. **Cloaca**—The cloaca is an enlarged part found where the large intestine joins the vent. Feces from the large intestine are passed out of the body through the vent. This is a common passageway for the ends of both the reproductive and digestive tracts.
10. **Liver**—The liver is an accessory organ to the digestive tract because it secretes bile, filters the blood and stores excess carbohydrates. The green colored **gall bladder** is embedded in the liver tissue. (The chicken has a gall bladder, but some other birds do not.) The liver has two bile ducts that carry the bile from the liver to the intestines. The right duct is enlarged to form the gall bladder, through which most of the bile passes and is temporarily stored. The **spleen** is a dark red organ next to the liver. Its main function is the destruction of red blood cells. The excretion of water and metabolic waste occurs largely through the kidneys. These wastes are filtered out as blood passes through the **kidneys**. The wastes are excreted as a whitish pasty substance that gives bird droppings their characteristic white color.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What was the easiest and most difficult part of the digestive system to understand? Why?

Use Activity Sheet 5, Digestive System Word Search, as a final review of terms.

#### Process:

2. What are the four basic functions of a bird's digestive system?
3. How does a bird make food particles smaller to prepare them for digestion?

#### Generalize:

4. What conclusions can be made about a monogastric digestive system? (Efficiency, Capacity, Problems?)

#### Apply:

5. How will understanding your digestive system help you eat the right foods?

### GOING FURTHER:

- Make a poster of the digestive system of a chicken and prepare a talk to present to your next club meeting or your school classroom.
- Visit a feed store and compare the composition of poultry feed with livestock feed fed to cattle and sheep.
- Help process a fryer and identify the digestive tract parts. Observe or take notes about the contents of each part and how it changes as digestion occurs.

### **REFERENCES:**

*Poultry Meat and Egg Production*, Parkhurst  
*Poultry Science*, Ensminger  
*Poultry Science*, Adams

### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed by:**

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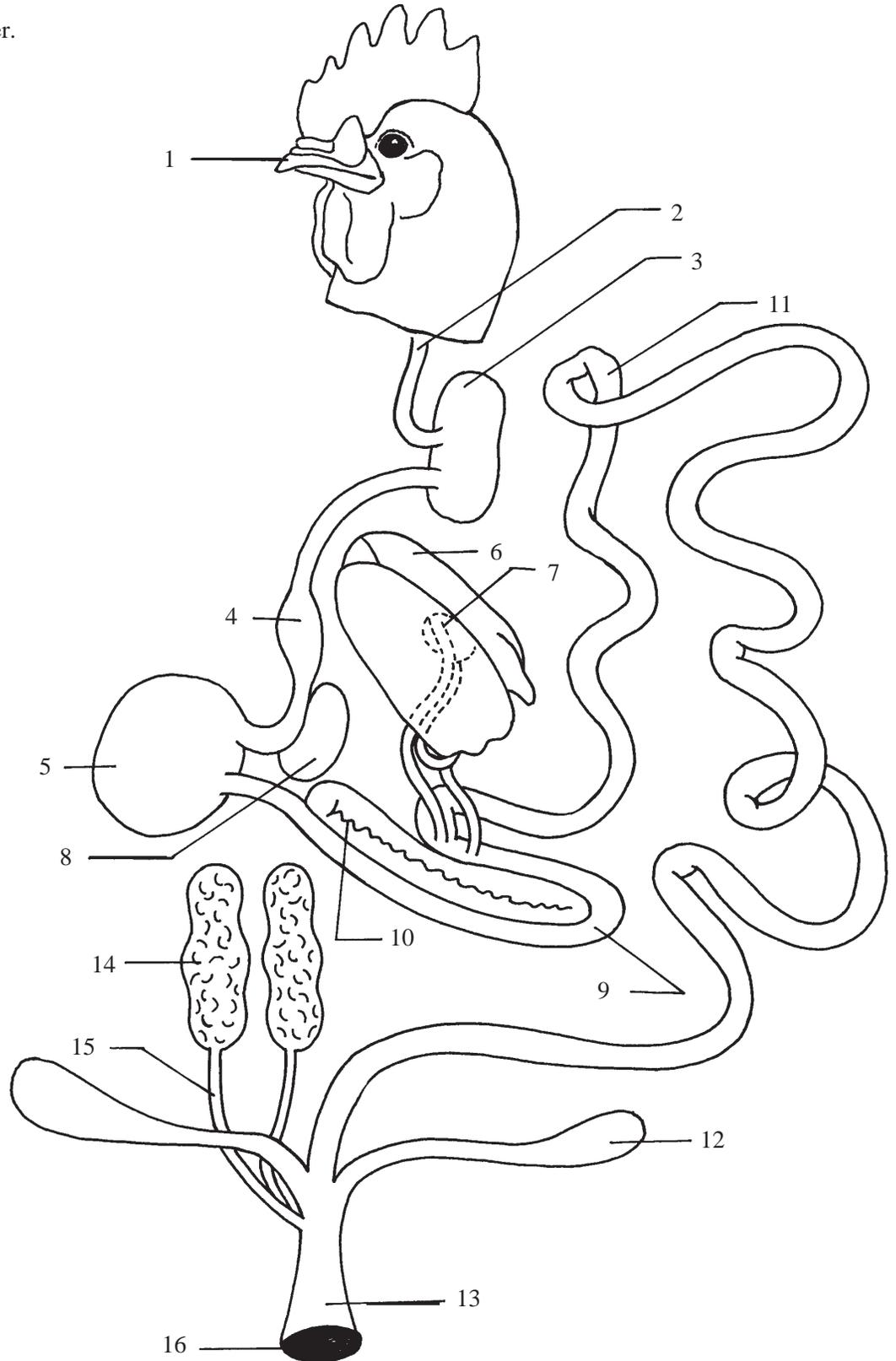
# CHICKEN'S DIGESTIVE SYSTEM

## POULTRY, LEVEL II

### Activity Sheet 4, Digestive Tract

Match name with number.

- \_\_\_ Beak and mouth
- \_\_\_ Ceca
- \_\_\_ Cloaca
- \_\_\_ Crop
- \_\_\_ Duodenal loop
- \_\_\_ Gall bladder
- \_\_\_ Gizzard
- \_\_\_ Glandular stomach
- \_\_\_ Gullet
- \_\_\_ Kidney
- \_\_\_ Large intestine
- \_\_\_ Liver
- \_\_\_ Pancreas
- \_\_\_ Small intestine
- \_\_\_ Spleen
- \_\_\_ Ureter



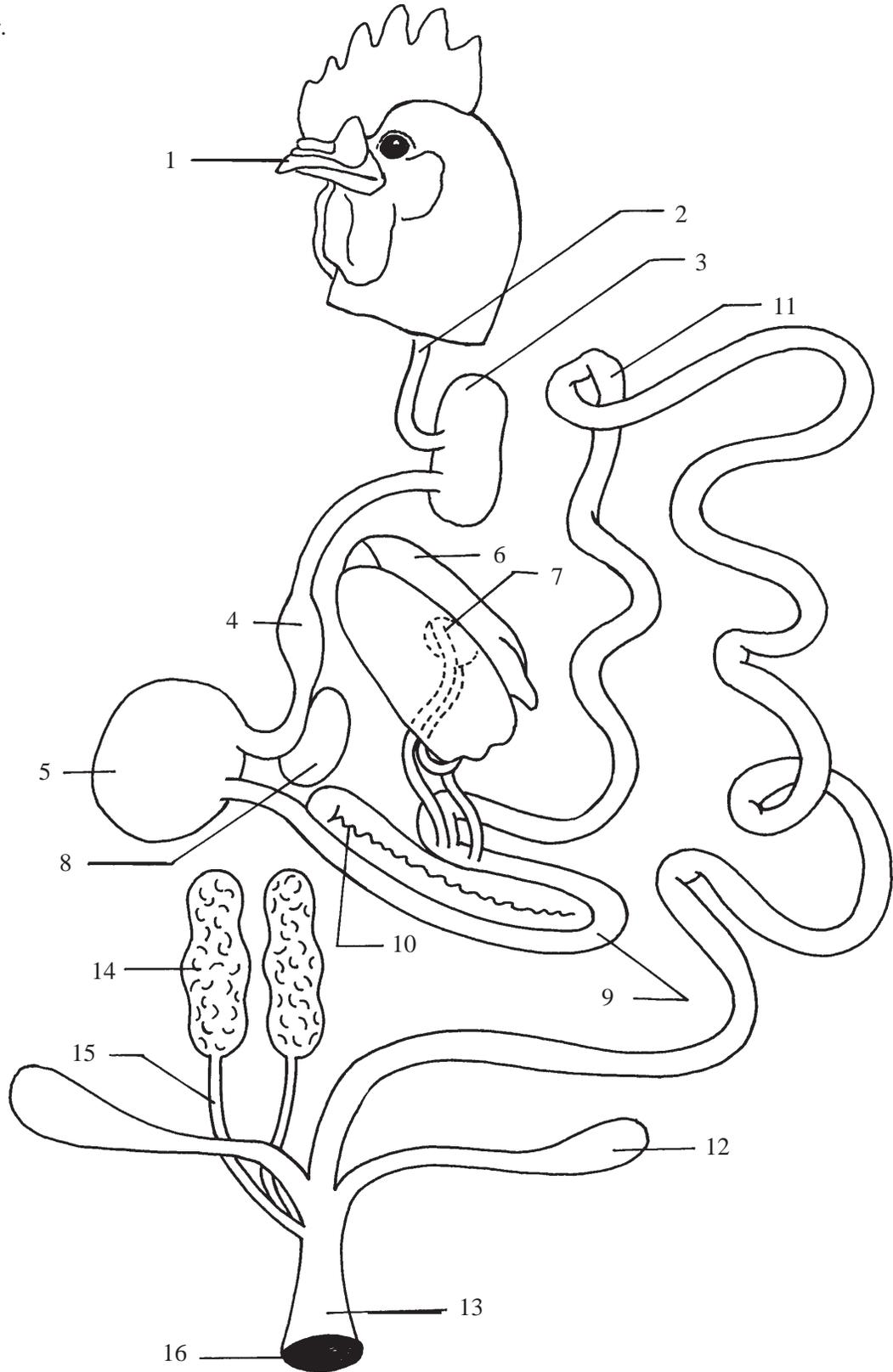
# CHICKEN'S DIGESTIVE SYSTEM

## POULTRY, LEVEL II

### Leader's Key, Activity Sheet 4, Digestive Tract

Match name and number.

1. Beak and mouth
2. Gullet
3. Crop
4. Glandular stomach
5. Gizzard
6. Liver
7. Gall bladder
8. Spleen
9. Duodenal loop
10. Pancreas
11. Small intestine
12. Ceca
13. Large intestine
14. Kidney
15. Ureter
16. Cloaca



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**CHICKEN'S DIGESTIVE SYSTEM**  
**POULTRY, LEVEL II**  
**Activity Sheet 5, Digestive System Word Search**

Find the hidden words in the puzzle.

prehension

digestion

monogastric

ceca

small intestine

gizzard

crop

grit

omnivore

liver

bile

gall bladder

O	M	N	I	V	O	R	E	J	D	N	O	O
S	O	Q	T	U	A	E	I	T	I	H	O	L
Z	N	P	T	S	S	E	U	U	G	E	M	G
X	O	A	E	U	M	U	T	T	E	E	N	A
G	G	I	Z	Z	A	R	D	D	S	I	A	L
L	A	T	A	Y	L	A	E	I	T	T	J	L
B	S	B	I	L	L	L	G	R	I	T	T	B
P	T	A	O	U	I	R	Y	O	O	S	T	L
P	R	E	H	E	N	S	I	O	N	S	S	A
I	I	S	E	U	T	K	S	U	S	M	U	D
A	C	E	C	A	E	S	L	A	E	I	O	D
H	H	H	R	K	S	H	I	M	B	I	L	E
O	P	P	O	P	T	M	V	A	E	O	U	R
M	E	M	P	A	I	E	E	Q	R	S	T	U
G	O	F	I	G	N	S	R	U	M	N	O	P
Q	S	C	W	D	E	V	R	G	N	T	H	M

# CHICKEN'S DIGESTIVE SYSTEM

## POULTRY, LEVEL II

### Leader's Key, Activity Sheet 5, Digestive System Word Search

Find the hidden words in the puzzle.

prehension

digestion

monogastric

ceca

small intestine

gizzard

crop

grit

omnivore

liver

bile

gall bladder

O	M	N	I	V	O	R	E	J	D	N	O	O
S	O	Q	T	U	A	E	I	T	I	H	O	L
Z	N	P	T	S	S	E	U	U	G	E	M	G
X	O	A	E	U	M	U	T	T	E	E	N	A
G	G	I	Z	Z	A	R	D	D	S	I	A	L
L	A	T	A	Y	L	A	E	I	T	T	J	L
B	S	B	I	L	L	L	G	R	I	T	T	B
P	T	A	O	U	I	R	Y	O	O	S	T	L
P	R	E	H	E	N	S	I	O	N	S	S	A
I	I	S	E	U	T	K	S	U	S	M	U	D
A	C	E	C	A	E	S	L	A	E	I	O	D
H	H	H	R	K	S	H	I	M	B	I	L	E
O	P	P	O	P	T	M	V	A	E	O	U	R
M	E	M	P	A	I	E	E	Q	R	S	T	U
G	O	F	I	G	N	S	R	U	M	N	O	P
Q	S	C	W	D	E	V	R	G	N	T	H	M



# Poultry Disease Prevention

## *Poultry, Level II*

### **What Members Will Learn . . .**

#### **ABOUT THE PROJECT:**

- Five major areas of a good disease prevention program
- Most common poultry disease to prevent

#### **ABOUT THEMSELVES:**

- Importance of a human disease prevention program

### **Materials Needed:**

- Pencil and paper
- Flip chart and markers

**ACTIVITY TIME NEEDED:** 45 MINUTES

### **ACTIVITY:**

### **Leader Notes**

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Disease prevention in poultry production is much more economical and effective than treating diseases with medications. Although the medication may relieve the problem, much of the damage is already done, such as retarded growth, reduced egg or meat quality and increased costs of production. However, with some simple planning steps, most diseases can readily be prevented.

#### **Housing**

First, plan the housing of the birds to provide good ventilation and adequate heat, feeder and waterer space. Overcrowding must be avoided as it is a major source of stress and disease in a flock. Keep different species in separate housing. If possible, also raise the age groups separately. Make sure the buildings or pens have good drainage, as excess moisture results in many disease problems. Construct the buildings or pens to be predator and wild bird proof.

#### **Nutrition**

It is best to use commercially available poultry feeds appropriate for the species, age and usage of the flock. Store feed in cool, dry, rodent-proof containers.

#### **Sanitation**

Good common-sense practices such as daily cleaning of waterers, removal of wet litter spots and frequent removal of manure should be practiced.

#### **Daily Bird Care**

Examine birds daily and weigh some individuals weekly. Remove sick and dead birds daily. Place sick birds in a pen far removed from the rest of the flock. Cull abnormal or lame birds.

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## Leader Notes

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Have the members discuss each of these topics in relation to disease prevention in small groups. As each group reports back, list major items on flip chart.

Using the items the group has outlined, have each group design a preventative health program listing daily, weekly and occasional activities for flock care.

### **Buying Birds**

Be sure to buy new stock from a hatchery or breeding source that is a participant of the National Poultry Improvement Plan. This will assure that the birds will be free from several of the egg-transmitted diseases such as *Salmonella pullorum* and the mycoplasmas. Have a quarantine pen available for any new arrivals and keep them there for three weeks before introducing them to the rest of the flock.

### **Traffic Control**

People are the main spreaders of diseases to and from poultry flocks. Be sure to screen all visitors prior to their coming into contact with the birds. Ask that they not come into contact with other birds on the day of the visit. Give them boots to wear before entering the poultry pens.

### **Vaccination**

Unless you have specific disease problems, it is best not to use vaccines. Most farms have coccidiosis. Therefore, preventative medication is necessary in the feed.

### **Medication**

Before using medication, be sure you have a diagnosis of the problem by your veterinarian. Always follow label instructions exactly.

## **DIALOGUE FOR CRITICAL THINKING:**

### **Share:**

1. What are some common disease prevention methods for poultry?
2. Which prevention method was most difficult to understand? Why?

### **Process:**

3. What are some common poultry health problems?
4. What are three ways to prevent the most common poultry health problems?

### **Generalize:**

5. What are some common human disease preventions?
6. How important are human disease prevention programs? (Such as immunization for mumps, measles, small pox, polio, etc.)

### **Apply:**

7. How will what you learned about disease prevention in this lesson help you avoid and prevent disease in the future?

### GOING FURTHER:

- Design a disease prevention program for your family.
- Give a presentation to civic groups about your poultry disease prevention program or the importance of a community disease prevention program.

### REFERENCES:

#### Author:

Dr. Eva Wallner-Pendleton, Avian Extension Veterinarian, University of Nebraska; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Poultry Parasites and Diseases

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Five common causes of poultry disease
- Three types of parasites

#### ABOUT THEMSELVES:

- The importance of personal hygiene in preventing parasites or disease

#### Materials Needed:

- Chalkboard or flip chart

#### ACTIVITY TIME NEEDED: 30 MINUTES

#### ACTIVITY:

#### Leader Notes

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Poultry can become ill from a number of diseases. These diseases are frequently classified according to their cause. Diseases can be caused by viruses, bacteria, parasites such as mites or worms, poor nutrition or toxic substances. The most common of these diseases will be discussed.

#### Parasites that live on skin and feathers

Mites and lice frequently live on the skin of poultry. **Lice** are true insects, while **mites** are related to spiders. Mites and lice are irritating to the birds, and frequently spread diseases among the flock. A flock may become infected through contact with other poultry or wild birds.

Diagnosing lice or mite infection involves careful inspection of each bird's feathers and skin. Mites frequently like to congregate under the bird's tail. Lice can be anywhere on the skin. Lice will place masses of eggs at the base of the feathers. Some mites feed only at night, then leave the bird during the day, so check the coop at night with a flashlight.

Treatment of these external parasites involves spraying or dusting with an insecticide. Treatment of the birds with flea powders approved for cats is safe and effective. Application of sprays or powders must be repeated at least two or three times, 10 days apart to eliminate the parasites. From then on, the birds should be inspected regularly, at least every two weeks for reoccurrence of these pests.

List each parasite or disease on chalkboard or flip chart as it is discussed. Ask members to give ideas first. Describe symptoms or show a bird with symptoms and ask members to suggest treatments.

#### Internal parasites

Poultry are frequently infected with a tiny, single celled organism called **coccidiosis**. These parasites live in the intestinal tract of birds, where they can cause much damage. Infected birds excrete the eggs of this parasite (called oocysts) in their droppings.

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## Leader Notes

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Other birds become infected when they eat the eggs while feeding on the ground.

Signs of coccidiosis include diarrhea, which is often blood-tinged. The sick birds begin to act cold, huddle together and fluff their feathers.

Diagnosis is achieved by identifying the parasite eggs in the droppings under a microscope.

Coccidiosis medication is given in the drinking water or the feed to stop the disease. Prevention of coccidiosis is primarily by keeping conditions in the poultry house dry and manure free.

### **Nutritional Diseases**

Nutritional diseases are common in small poultry flocks. Although most commercially available feeds are nutritionally balanced, each type of feed is specifically designed for a given species of poultry for a specific purpose. For instance, starter rations are designed for baby chicks while lay rations are formulated for birds in egg production. It is very important to adhere to the diet formulated for the species and age group.

Sometimes even birds on commercial rations may suffer from a deficiency of a nutrient if the feed has been mishandled, i.e. allowed to get wet, or improperly stored. Commercial feeds occasionally get diluted with added grain. This results in malnutrition, obesity and poor production. To prevent malnutrition; scraps, grain, and foraging should not constitute more than 10 percent of the poultry diet.

Typical signs of malnutrition may include:

- poor, dull feathering and scaly skin,
- soft and curved leg and keel bones,
- high percentage of runts and poor-doers,
- poor egg production, soft shelled eggs
- poor egg fertility and hatchability.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What poultry diseases have your birds experienced? Why?
2. What poultry parasites have you seen? Where or when?

#### **Process:**

3. What are three causes of poultry diseases?
4. What are three types of parasites?

**Generalize:**

5. Has your school ever experienced an outbreak of lice or other parasite? How was the problem handled?

**Apply:**

6. How can you help prevent parasite infestations?

**GOING FURTHER:**

- Visit a veterinarian to see parasite samples.
- Check for parasites in your flock.
- Check feed tags at a feed store to see what medications are added for parasite or disease control.

**REFERENCES:**

*Suggested Treatments for Diseases and Internal Parasites of Poultry*,  
(L765) K-State Research and Extension

**Author:**

Dr. Eva Wallner-Pendleton, Avian Extension Veterinarian, University of  
Nebraska; James P. Adams, Extension Specialist, 4-H Youth Programs,  
Kansas State University

**Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State  
University; R. Scott Beyer, Extension Specialist, Poultry Sciences,  
Kansas State University

**Think Back:**

Discuss with your group and record your thoughts about any part of  
a bird's structure or digestive system that might cause or prevent a  
disease. (Note: Recordings should be added to record book. Extra  
sheets with this discussion could be made for each member.)

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# Cracking Up—What's in an Egg?

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The major parts of an egg
- The functions of the parts of an egg
- How an egg loses quality

#### **ABOUT THEMSELVES:**

- Their feelings about learning by doing

#### **Materials Needed:**

- Several fresh eggs (both brown and white if possible)
- Clear glass plate
- Hot tap water
- Large clear water glass or fruit jar
- Sharp knife
- Member Handout 1, Parts of an Egg

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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The egg is one of nature's most complete foods. The reason for this high nutritional value is that the developing chick's only source of food during its stay inside the egg is the nutrients present in the egg. This explains the perfect balance of the six nutrients essential for growth.

The egg is made up of many complex parts. An understanding of these parts, how they are formed and their functions is very helpful if you plan to conduct experiments on incubation, embryonic development and brooding, or want to learn about how to determine the quality of eggs that you buy.

#### **The Shell**

Looking at the egg from the outside, we first see the shell. It is a hard, protective covering that is composed primarily of calcium carbonate. Its function is to provide protection to the egg contents and to provide certain minerals to the developing embryo. The shell is very porous. A normal egg shell has 6,000 to 8,000 pores (holes) throughout the shell. These pores permit the transfer of oxygen, carbon dioxide and water in and out of the shell for the developing embryo. Shell color is a genetic trait. The White Leghorn, the most popular egg-type chicken in the United States, lays white-shelled eggs, while the American breeds, such as the Rhode Island Red, Plymouth Rock and New Hampshire, lay brown-shelled eggs. Shell color has no influence on the nutritional content of an egg. The shape and size of an egg are influenced by genetics, nutrition and the environment of the hen.

Give each member a fresh egg and have each of them describe the appearance of the outer shell. List their comments on a chalkboard or flip chart.

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## Leader Notes

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Have members break a fresh egg onto a glass plate. Examine the shell carefully and observe the tiny pores, shell membranes and the air cell.

Place a cool whole egg into a jar of hot tap water. Observe the air bubbles arising from the shell surface of the egg. Have members explain why this happens.

Hand out Member Handout 1, Parts of an Egg. Have members carefully examine and identify the various parts of an egg. With a sharp knife, cut across the thick white. The thin watery material that flows out of the opening is the inner layer of thin white.

### Shell Membranes

On the inner surface of the shell are two soft shell membranes which surround the white and yolk of the egg. These membranes provide a barrier against the invasion of microorganisms into the liquid of the egg. Note the air cell that is found at the large end of the egg between the two shell membranes. A newly laid egg has a very small air cell. As the egg cools at time of laying from a temperature of 107°F to the atmospheric temperature, the contents contract, creating a vacuum which draws air through the larger, more porous end of the shell. As a result, the air cell is formed at the large end of the egg. As the egg ages, the loss of moisture increases the size of the air cell. Storing eggs in a warm, dry environment speeds up this loss of moisture. The depth of the air cell of an egg is the major factor in determining its quality; the deeper the air cell, the lower the quality.

### The Albumen (White) and Yolk

Note the two white cords that are attached to the yolk and imbedded in the thick white. These two cords, called the **chalaza**, hold the yoke in the center of the egg. These cords disappear as the egg ages.

The thick white of the egg contains primarily water and protein. The yolk contains large amounts of fat, vitamins and minerals that are essential for normal embryonic development. Note the white spot on the surface of the egg. This is the germ spot or living part of a fertilized egg.

As an egg ages after it is laid, physical and chemical changes take place. Moisture is lost from the white and yolk, which causes the air cell to increase in depth. The thick white turns to thin white. The yolk absorbs water from the white, which stretches the yolk sac, resulting in a large flat yolk. These chemical and physical changes do not affect the nutritional content of the egg, but do affect the functional and physical appearance of the cooked egg.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What does the shell of an egg feel like?
2. How many egg parts were you able to identify?

#### Process:

3. What are the four major parts of an egg?
4. Why do various species of birds have different colored egg shells?

**Generalize:**

5. Cracking an egg and examining the parts is a delicate procedure. What did you learn about yourself from this activity?
6. What is your opinion about learning by doing? Why?

**Apply:**

7. What would you do differently next time? Why?
8. How can you use the learning by doing model in other non 4-H activities?

**GOING FURTHER:**

- Study what causes color variations in egg yolks.
- Study what affects nutritional differences in eggs.

**REFERENCES:**

*Incubating Chicken Eggs*, Kansas State University 4-H 138c

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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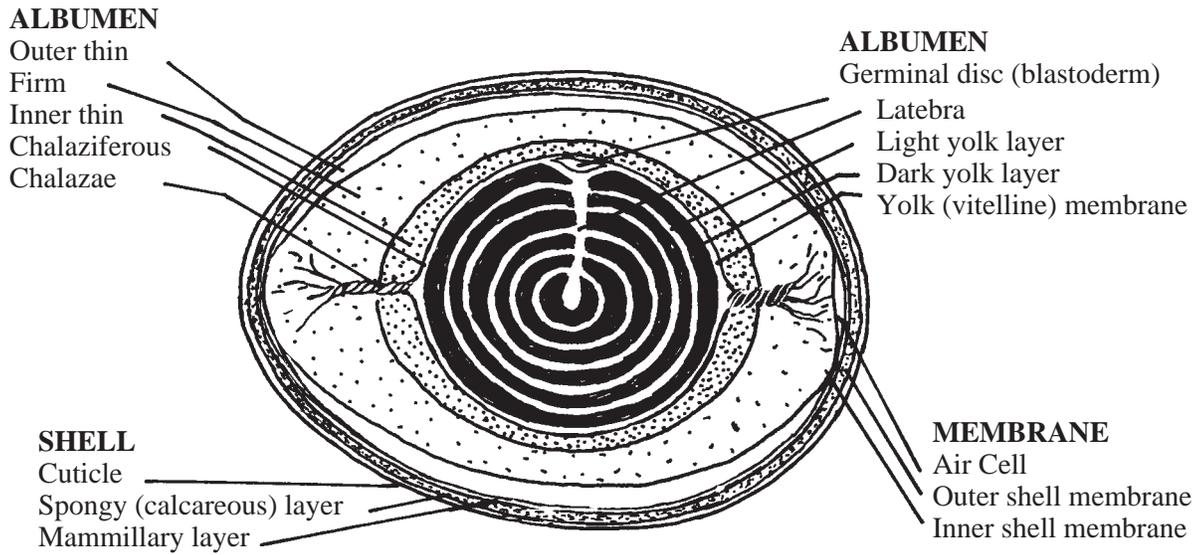
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## CRACKING UP—WHAT'S IN AN EGG?

### POULTRY, LEVEL II

#### Member Handout 1, Parts of an Egg



The parts of an egg. (From the Egg Grading Manual, USDA Agricultural Handbook No. 75, July 1961.)



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# Making and Using an Egg Candler

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- How to construct a simple, inexpensive candler
- The methods and reasons for candling eggs
- The differences between a fertile and non-fertile egg
- The differences in various qualities of eggs

#### ABOUT THEMSELVES:

- Their feelings about their ability to make and use an egg candler
- Their feelings about being able to use technology to plan for the future

#### Materials Needed:

- An oatmeal box, shoebox or tin can
- An extension cord and a 60-watt bulb
- A dark room
- Fertile and non-fertile eggs and high and low quality eggs (obtain about one week before the meeting)
- Member Handout 2, Wood Box Egg Candler, Canded Eggs

#### ACTIVITY TIME NEEDED: 45 MINUTES

#### ACTIVITY:

You can construct a simple, inexpensive candler from an oatmeal box, a tin can or wood box as shown in the Member Handout 2. Cut a 1-inch hole in the side of the box or can. Obtain an extension cord and mount a 60-watt bulb inside the candler.

Candling eggs consists of holding the eggs in front of a bright light in a darkened room. Eggs can be candled individually by holding the large end in front of the light, rotating gently and observing the contents illuminated by the light rays. During candling, the following characteristics can be observed: the presence or absence of embryonic development and those characteristics that indicate the interior and exterior quality of an egg. An infertile (market egg) will have a well-defined yolk shadow, air sac, and **chalaza** (cord-like attachment of yolk to the albumen or egg white). A living embryo will have a small dark spot (on the yolk) with a distinct network of blood vessels coming from the spot. A dead germ will have a dark spot on the yolk without the clear network of blood vessels.

Eggs purchased in the supermarket have been mass candled, which involved passing a large number of eggs at one time over a bright light. Hold the large end of the egg up to the candling light at a 45-degree angle.

#### Leader Notes

Have members construct an egg candler.

Refer to Member Handout 2, Wood Box Egg Candler, Canded Eggs.

Several days prior to the meeting, purchase three to four eggs per member at the store. Place half the eggs in the refrigerator and store the other half at room temperature. Have members candle the eggs and note differences in the air cell depth, yolk movement and prominence of the yolk shadow of the eggs.

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## Leader Notes

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This allows you to observe the air cell, the yolk and the white. Hold the egg between your thumb and first two fingers. Then, by turning your wrist quickly, you can gently cause the inside of the egg to twirl.

Observe the depth of the air cell, which is the distance from its top to its bottom when the egg is held air cell up. In a high quality (grade AA) egg, the air cell is small, not more than  $\frac{1}{8}$ -inch deep. As an egg declines in quality, the air cell increases in depth from evaporation of moisture from the egg. A grade A egg can have an air cell depth up to  $\frac{3}{16}$ -inch. An egg with an air cell depth greater than  $\frac{3}{16}$ -inch is grade B.

A high quality egg's yolk moves only slightly when twirled because the yolk is surrounded by a dense layer of thick white. As the egg ages or deteriorates in quality, the white thins and the yolk tends to move more freely and approaches the shell more closely; then the yolk is more visible and darker.

The condition of the white influences the behavior of the yolk when the egg is twirled. Blood or meat spots become apparent when the egg is candled. Eggs with blood or meat spots over  $\frac{1}{8}$ -inch in diameter are classified as inedible. Eggs with spots smaller than  $\frac{1}{8}$ -inch are classified as grade B. When determining the grade of an egg by candling, the lowest quality factor will determine the grade.

One week in advance of the meeting, set several eggs each day in an incubator. This will provide several examples of embryos in different stages of development from one to seven days.

Have members candle the eggs and classify them as infertile, living embryo, or dead germ.

Candling can be done as early as three days after the start of incubation to determine fertility, but is more accurate after seven days, particularly with brown-shelled eggs. A fertile egg will have a small dark spot in the center of the egg with a network of blood vessels branching out. An infertile egg shows no evidence of development and has the appearance of a market egg when candled. Early dead germs (death prior to appearance of blood) are difficult to distinguish by candling. Eggs showing rings, streaks of blood or tissue adhering to the shell contain embryos that have died early in the incubation period.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was the first impression of the egg candler you made?
2. What was the easiest part of the egg to see? Why?

#### **Process:**

3. What problems did you have when candling eggs?
4. How were you able to determine an infertile egg from a fertile egg?

#### **Generalize:**

5. What other instruments allow you to see inside or through something? (Examples: Ultrasound, X-ray)

**Apply:**

6. How can the use of technology help you plan for the future?
7. What other planning methods are useful? Why?

**GOING FURTHER:**

- Visit a hatchery or egg processing plant and observe mass candling of eggs.
- Demonstrate your candler to your class at school or arrange to demonstrate it at a grocery store.

**REFERENCES:**

*Poultry Judging*, Nebraska Extension 4-H 92

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# MAKING AND USING AN EGG CANDLER

## POULTRY, LEVEL II

### Member Handout 2, Wood Box Egg Candler, Candled Eggs

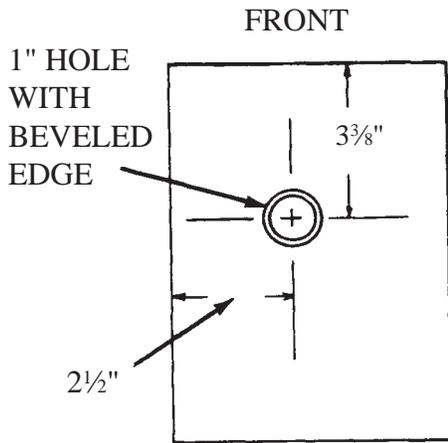


FIGURE 1

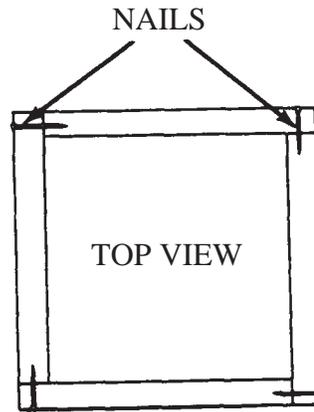


FIGURE 2

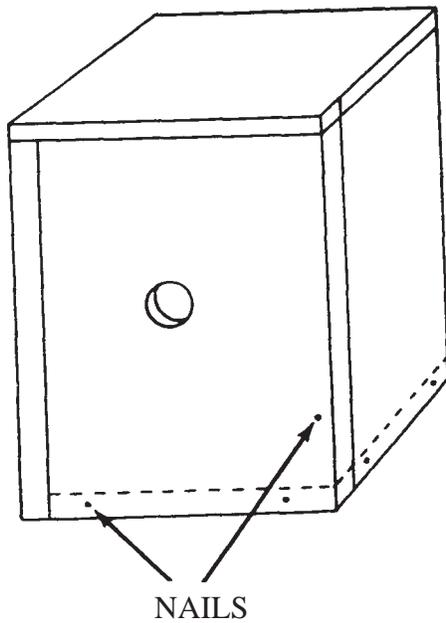


FIGURE 3

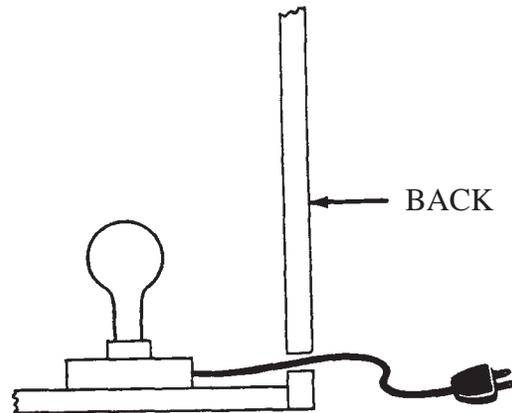


FIGURE 4

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## MAKING AND USING AN EGG CANDLER

### POULTRY, LEVEL II

#### Member Handout 2, Wood Box Egg Candler, Candled Eggs, *continued*

##### Wood Box Egg Candler

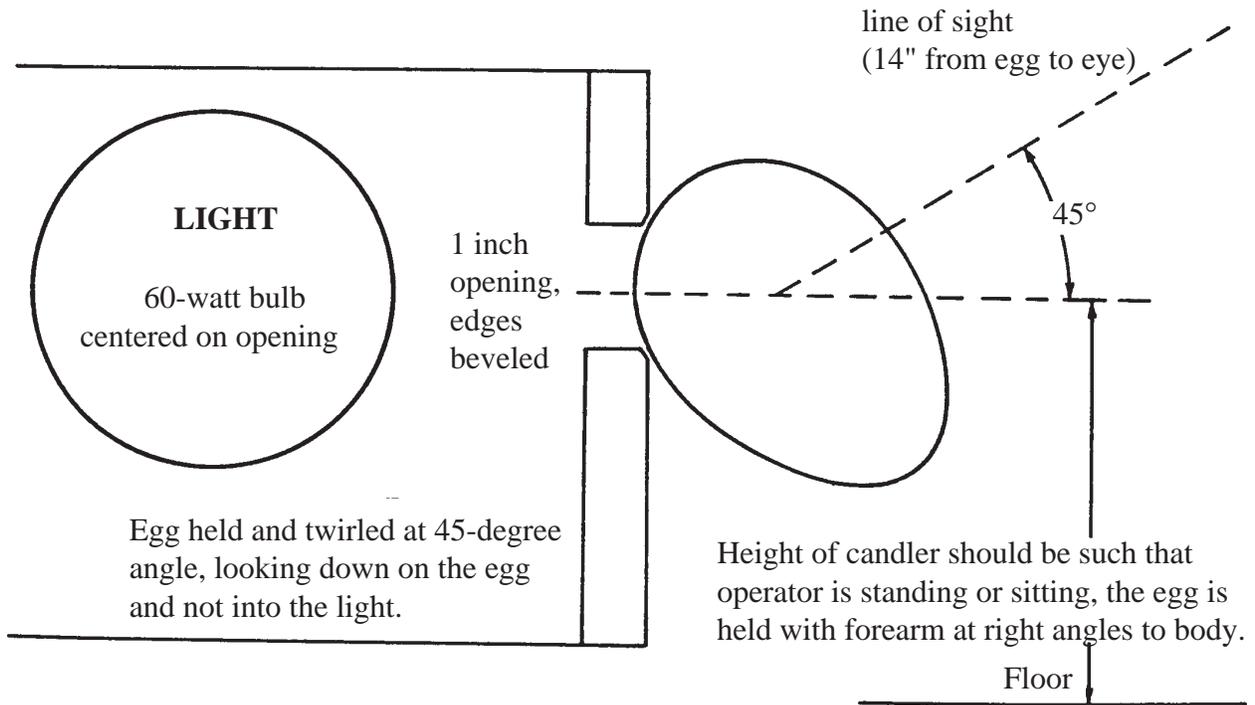
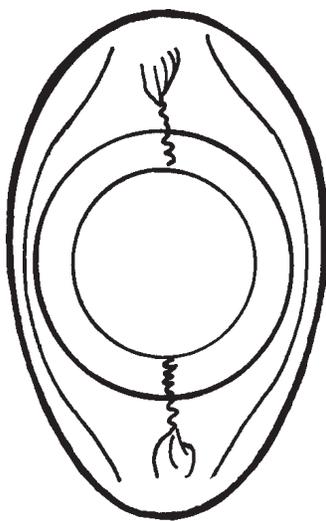
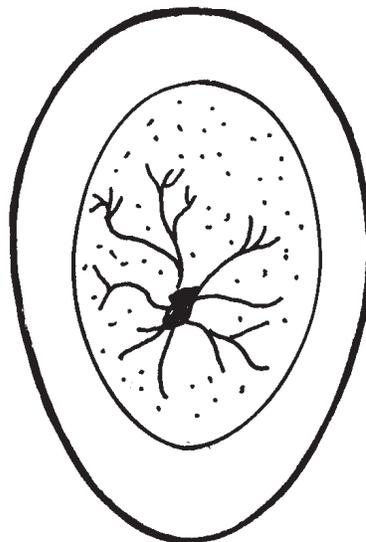


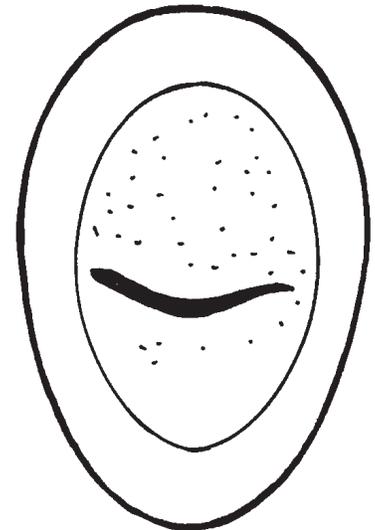
Figure 6—Candled Eggs (4-7 days )



Infertile (Market)



Live Embryo



Dead Germ





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# Constructing a Small Incubator

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The two most important factors in hatching eggs
- Incubation factors for several poultry species
- How to build a small incubator

#### **ABOUT THEMSELVES:**

- The importance of following directions
- The importance of patience in their lives

#### **Materials Needed:**

- Member Handouts 3 and 4, Incubation for Eggs of Domestic Birds
- Member Handout 5, Homemade Incubator with Automatic Temperature Regulator, plus all materials listed on this handout
- Hammer, screwdriver, tape measure, etc.

**ACTIVITY TIME NEEDED:** 60 TO 120 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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Building your own incubator and then using it to hatch eggs will be a very exciting project. You will get a lot of satisfaction out of constructing the incubator and then watching it work.

The operation of the incubator will increase your knowledge as to the proper environment needed for hatching eggs.

Some incubators are made from a foam cooler using the cooler as an outside shell of the incubator, rather than wood. The other components of the incubator would be the same in either case.

There are several companies which supply incubators and incubator parts. Their addresses are listed below:

Let members work in small groups to build the number of incubators desired.

G.Q.F. Manufacturing Co.  
P.O. Box 1552  
Savannah, GA 31498  
Phone (912) 236-0651

Lyon Electric Co., Inc.  
Marsh Farms Products  
2765 Main Street  
Chula Vista, CA 92001  
Phone (619) 585-9900

Stromberg's  
Box 400  
Pine River, MN 56474  
Phone (218) 587-2222

Val-A Company  
700 West Root Street  
Chicago, IL 60609  
Phone (312) 927-9442

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## Leader Notes

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Once your incubator is constructed, you need to operate it without eggs to master the temperature and humidity controls. When you are sure it is working properly, you are ready to begin your exciting project of hatching your own chicks.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was the most difficult part of the incubator to make? Easiest? Why?
2. How did it feel after you had finished making the incubator?

#### **Process:**

3. What problems did you have while making the incubator?
4. What other items have you made that had similar problems?

#### **Generalize:**

5. How important is it to follow directions and do things in a specific order? (Give examples and discuss)
6. What did you learn about patience from this activity?

#### **Apply:**

7. What other things do you do that require specific directions and patience to accomplish? Why?

### **GOING FURTHER:**

- Try hatching eggs of other species.
- Give a presentation on how you made your incubator.
- Use your incubator to hatch eggs in your school classroom.
- Use your incubator as a fair booth or window display.

### REFERENCES:

#### Author:

John Struwe, Extension Assistant, University of Nebraska—Lincoln;  
James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas  
State University

#### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State  
University, R. Scott Beyer, Extension Specialist, Poultry Sciences,  
Kansas State University

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## CONSTRUCTING A SMALL INCUBATOR

### POULTRY, LEVEL II

#### Member Handout 3, Incubation for Eggs of Domestic Birds

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Requirements	Chicken and Bantam	Turkey	Duck*	Muscovy Duck	Goose	Pheasant
Incubation Period (days)	21	28	28	35–37	28–34	23–28
Forced-Air Operating Temperature** (degrees F, dry bulb)	99¾	99¼	99½	99½	99¼	99¾
Humidity (degrees F, wet bulb)	85–87	83–85	84–86	84–86	86–88	86–88
Do not turn eggs after	19th day	25th day	25th day	31st day	25th day	21st day
Operating temperature during last 3 days of incubation (degrees F, dry bulb)	99	98½	98¾	98¾	98½	99
Humidity during last 3 days of incubation (degrees F, wet bulb)	90–94	90–94	90–94	90–94	90–94***	92–95
Open ventilation holes one-fourth	10th day	14th day	12th day	15th day	1st day	12th day
Open ventilation holes further if needed to control temperature	18th day	25th day	25th day	30th day	25th day	20th day

\* It has been reported that duck eggs hatch better in still-air incubators than in forced-air incubators.

\*\* For still-air incubators add 2 to 3°F to the recommended operating temperatures.

\*\*\* Better hatchability may be obtained if goose eggs are sprinkled with warm water or dipped in lukewarm water for half a minute each day during the last half of the incubation period.

## CONSTRUCTING A SMALL INCUBATOR

### POULTRY, LEVEL II

#### Member Handout 4, Incubation for Eggs of Domestic Birds

Requirements	Guinea Fowl	Peafowl	Bobwhite Quail	Coturnix Quail	Chukar Partridge	Grouse	Pigeon
Incubation Period (days)	28	28–30	23–24	17	23–24	25	17
Forced-Air Operating Temperature* (degrees F, dry bulb)	99¾	99¼	99¾	99¾	99¾	99¾	99¾
Humidity (degrees F, wet bulb)	83–85	83–85	84–86	84–86	80–82	82–86	84–86
Do not turn eggs after	25th day	25th day	21st day	15th day	21st day	22nd day	15th day
Operating temperature during last 3 days of incubation (degrees F, dry bulb)	99	99½	99	99	99	99	99
Humidity during last 3 days of incubation (degrees F, wet bulb)	90–94	90–94	90–94	90–94	90–94	90–94	90–94
Open ventilation holes one-fourth	14th day	14th day	12th day	8th day	12th day	12th day	8th day
Open ventilation holes further if needed to control temperature	24th day	25th day	20th day	14th day	20th day	21st day	14th day

\* For still-air incubators add 2 to 3°F to the recommended operating temperatures.

**Think Back:**

What do you think is the most unique feature of an egg? Why?

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# Determining the Sex of Poultry

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The different methods of determining the sex of young and mature poultry
- The reasons for separating day-old male and female poultry

#### ABOUT THEMSELVES:

- The importance of sexing birds on the finances of a producer

#### Materials Needed:

- Pictures, slides or illustrations of various breeds and varieties of chickens
- Member Handout 6, Feather Sexing Broilers

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### ACTIVITY:

Various methods have been developed to determine sex of both day-old and adult poultry. Sex of day-old chickens, turkeys, ducks, geese and guineas can be determined by these methods.

**Feather Sexing.** This is the most common method used for chickens and involves the following steps:

1. Spread wing out like a fan.
2. Look at feathers on outer joint—bottom row of feathers are primaries, top row of feathers are coverts.
3. When the bottom row (primaries) of feathers is longer than top row (coverts), the chick is a female.
4. When the bottom row (primaries) of feathers is the same length, or shorter than top row (coverts), the chick is a male.

Certain breeds or crosses may be difficult to sex using this method.

**Japanese Vent Sexing.** This method involves visual examination of the sex organ in the vent of the day-old bird. Structural differences between the male and female allows accurate determination of the bird's sex. This method requires considerable practice to develop speed and accuracy. An experienced sexor can sex 400 to 600 birds an hour. This method is primarily used for turkeys.

**Autosexing.** The genetic code which determines what a bird looks like is carried on chromosomes. One chromosome carries the gene which determines the sex of the bird. This same chromosome carries other genes which result in differences in feather color, size, etc., based on the sex of

#### Leader Notes

Give members copies of Member Handout 6, Feather Sexing Broilers.

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## Leader Notes

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Using pictures or slides of different breeds and varieties of poultry, have youth identify the physical differences in the secondary sex characteristics.

the bird. Some of these differences appear in day-old chicks. For instance, day-old, barred male chicks have completely black down except for a white spot on top of the head, while the non-barred females have all black down. This method is used most in gamebirds and exotic fowl.

The sex of mature birds can usually be determined visually by observing differences in their secondary sex characteristics. As birds near the age of sexual maturity, their gonads (ovary in the female and testes in the male) increase the output of the male sex hormone **testosterone**. This hormone causes development of visual external physical characteristics that can be used to determine the sex of sexually mature birds.

In **chickens**, the comb and wattles become bright red. Normally, the cockerel's comb and wattles are larger than the pullet's because of a higher blood level of testosterone. When the gonads of a chicken are inactive, such as during molting, the comb and wattles regress in size and lose their red color from a lower blood level of the hormone. Another influence of testosterone in the cockerel is development of male feathering on the hackles, back and tail. The feathers of the male are elongated with pointed tips while those of the female are short with rounded tips. Another characteristic of cockerels is they crow.

An adult male turkey (**tom**) has a more developed and a brighter colored **snood** and **caruncle** than the **hen**. Also, the tom usually has a tuft of coarse hair on its breasts called the **beard**.

Adult waterfowl are difficult to sex except those breeds of ducks, such as the Rouen and Mallard, in which the male (**drake**) has more brightly colored plumage than the female (**duck**). In Pilgrim geese, the male (**gander**) is white-feathered and the female (**goose**) is gray-feathered. In most breeds of ducks, the tips of the middle tail feathers on the adult drake curl forward. This does not occur on the duck. Sex of the adult goose can be determined by visual examination of the sex organ in the vent of the bird. The organ is much more developed in the gander than the goose.

Sexing adult **guineas** is very difficult because they differ so little in appearance. Usually, sex may be distinguished by the difference in the cry of the birds, and by the larger helmet, thicker wattles, and coarser head of the male. The cry of the female sounds like "buckwheat" or "put-rock," and is quite different from the one syllable shriek of the male.

With a few exceptions, adult male chickens, turkeys, waterfowl and guineas have a larger body size than the female. The sex of some breeds of mature chickens is easy to tell because the male has more brilliant colored plumage than the female. The Rhode Island Red, New Hampshire Red, and Brown Leghorn are examples of this characteristic.

**DIALOGUE FOR CRITICAL THINKING:****Share:**

1. What are two methods to determine the sex of day-old poultry?
2. What are some of the physical secondary sex characteristics of adult poultry?

**Process:**

3. What species of poultry exhibit secondary sex characteristics that are more difficult to recognize? Why?
4. Why is it important to divide poultry species by sex?

**Generalize:**

5. What other animal projects have a need to split animals by sex? Why?
6. What management or feeding practices are affected by the sex of the bird or animal? Why?

**Apply:**

7. What other industries treat animal or bird species differently? (Consider economics, health, safety, etc.)

**GOING FURTHER:**

- Visit a poultry show, preferably one that has different breeds and varieties of poultry, and observe the differences in appearance of the males and females.
- Make arrangements to visit a hatchery and observe birds being sexed.

**REFERENCES:**

*Poultry Science*, by Ensminger  
*Standard of Perfection*, American Poultry Association  
*Cobb-Vantress*, P.O. Box 1030, Siloam Springs, Arkansas 72761-1030

**Author:**

Albert W. Adams, Extension Specialist, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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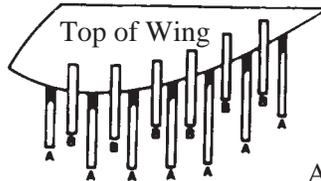
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**DETERMINING THE SEX OF POULTRY**  
**POULTRY, LEVEL II**  
**Member Handout 6, Feather Sexing Broilers**



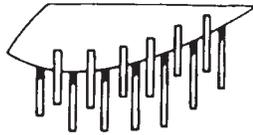
A-Primaries  
 B-Coverts

**Females**  
 Coverts always shorter than  
 primaries

At hatching all  
 feathers short but  
 coverts extend only  
 $\frac{1}{2}$  to  $\frac{3}{4}$  length of  
 primaries.



After several hours  
 feathers longer but  
 coverts still  $\frac{1}{2}$  to  $\frac{3}{4}$   
 length of primaries.



**Males**  
 Coverts always as long as  
 or longer than primaries

Coverts and  
 primaries extend  
 same length.



Coverts extend  
 slightly beyond  
 primaries.



Coverts extend  
 greatly beyond  
 primaries.



1. Spread wing out like a fan.
2. Look at feathers on outer joint—bottom row of feathers are primaries, top row of feathers are coverts.
3. When the bottom row (primaries) of feathers is longer than top row (coverts), the chick is a female.
4. When the bottom row (primaries) of feathers is the same length, or shorter than top row (coverts), the chick is a male.

Permission granted from Cobb-Vantress.





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# Maternal Bonding and Imprinting (Follow the Leader)

*Poultry, Level II*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- How bonding occurs in poultry
- The value of a bonding relationship in poultry
- How to identify the various bonding relationships

### ABOUT THEMSELVES:

- How they feel about bonding relationships

## Materials Needed:

- Facilities to raise two or three newly hatched chicks for a week

**ACTIVITY TIME NEEDED:** 1 WEEK

## ACTIVITY:

A typical feature of maternal behavior in poultry is that the prospective mother, if allowed to follow her natural instinct, will withdraw from the flock before the young are hatched. The hen finds a secluded site for laying a nest full of eggs and then incubating them.

After the young hatch, bonding between the hen and chicks occurs because the hen usually prevents contact between her chicks and other hens or chicks by chasing the intruders away. Hens recognize their own chicks, and the chicks learn to recognize their own mother. The hen attracts her own chicks by calling, and by tidbiting or pecking conspicuously at food or litter.

Chicks will form a bond with and follow the first animated object that they are exposed to several times after hatching. For example, if chicks are isolated after hatch and exposed to a moving object, such as a toy or a human, they tend to form a bond with the toy or human. This relationship is called imprinting or follow-the-leader behavior.

## DIALOGUE FOR CRITICAL THINKING:

### Share:

1. What happened as you raised the chicks with an animated object?
2. How long did it take for your chick to bond or imprint with the object?

## Leader Notes

Introduce this topic and then have members raise a newly hatched chick or two for one week with another animate object. Bring the chicks and objects back a week later to observe and discuss the bonding that occurred.

Discuss this attraction in other birds, wildlife, and other animals. Could this be called parenting? Divide members into small groups of two or three to discuss and report back.

Either purchase or hatch a few chicks and spend time with them each day. Expose them to an animated toy several times each day and observe how long it takes them to follow you or the toy. The imprinting process is most effectively demonstrated when chicks are separated from each other.

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## Leader Notes

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### Process:

3. What problems did you have with this experiment?
4. Why do you think bonding occurs?

### Generalize:

5. What other species have you observed bonding or imprinting?
6. What did you learn about yourself from this activity?

### Apply:

7. How will your understanding of bonding be useful to you in the future?
8. What could you do different, to get different results, if you did the experiment again?

### GOING FURTHER:

- Have someone in your group continue to raise the chicks together after the first week to see how they adapt.
- Videotape your second meeting to record the bonding that occurred.
- Share your experiences with other classmates or groups.

### REFERENCES:

*Poultry Sciences*, Ensminger

### Author:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Preventing Cannibalism

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Causes of cannibalism
- Ways to prevent cannibalism

#### **ABOUT THEMSELVES:**

- Preventive measures for self protection
- Behaviors they have that could be harmful to others

#### **Materials Needed:**

- Member Handout 7, Degrees of Beak Trimming and Anti-peck Devices
- Mechanical devices—specs, blinders, peck guards, bits (optional)

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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**Cannibalism** in poultry is one bird pecking the feathers, combs, toes or vent of other birds. If cannibalism isn't prevented, it can result in death or lowering of market value due to poor feathering and damaged bodies.

Usually, the exact cause of cannibalism cannot be traced to any one factor. Cannibalism may start because of:

- Overcrowding or overheating—may cause birds to be uncomfortable.
- A lack of a nutrient in the feed—particularly protein, may cause the birds to peck penmates' feathers to satisfy their hunger for protein.
- Excessive light—can make birds nervous and allow them to better see wounds on penmates.
- Inadequate feeding and nesting space—increases the competition for feed and water which can encourage cannibalism.
- Mixing of birds of different ages, colors, or stages of maturity—disrupts the social order of a flock, encouraging cannibalism.

There are several different methods for prevention and control of cannibalism. Prevention stops the development of bad pecking habits before they get started. In some cases, removing the cause(s) will result in discontinuation of cannibalism.

**Beak trimming**, which is removal of a portion of the bird's beak, is the best preventative measure. Beak trimming can be done at any age. There is no one beak trimming program that fits all situations. Broiler chicks are usually beak trimmed at the hatchery. Egg-type chicks are usually beak

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## Leader Notes

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If possible, plan to show or demonstrate some of these devices.

Give each member the Member Handout 7, Degrees of Beak Trimming and Anti-peck Devices, and do at least one of the following activities: (1) visit a hatchery and observe beak trimming of day-old birds. See if each member could actually trim the beak of one or two birds, or (2) observe a flock of birds that have been beak-trimmed or have been equipped with anti-peck devices.

trimmed at 6 to 10 days and again at 12 to 14 weeks of age. Beak trimming is best done with an electric beak trimmer.

Control with **mechanical devices** such as specs, blinders, peck guards or bits are used by some producers. These devices are attached to the bird's beak and prevent pecking by either limiting their vision or preventing complete closure of its beak.

**Miscellaneous** methods that give variable results are: (1) providing other objects for the birds to peck, such as alfalfa hay, (2) increasing the salt content of the ration, and (3) darkening the interior of the pen or using red-colored lights. These adjustments make it more difficult for the birds to see bloody wounds on penmates.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How did the chick react after the beak was trimmed?
2. What problems did you or others have when trimming beaks?

#### **Process:**

3. Why is it often necessary to trim beaks?
4. What other methods have you used or observed that help prevent cannibalism in poultry?

#### **Generalize:**

5. What are some preventative measures that producers do to provide for the general safety of other farm animals?
6. What are some safety precautions that you use everyday at home or school? Why?
7. How do you attempt to prevent a friend's negative behavior?

#### **Apply:**

8. What are some ways to prevent negative group behavior?

### **GOING FURTHER:**

- Research the common causes of poultry cannibalism to see which is the most prominent.
- Give a presentation on the need for preventing cannibalism in poultry.

**REFERENCES:**

*Poultry Science*, Ensminger  
*Cannibalism in the Small Poultry Flock*, K-State Research & Extension  
Publication

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State  
University; James P. Adams, Extension Specialist, 4-H Youth Pro-  
grams, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State  
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Poultry Leaders Notebook, Kansas State University, May 1998.

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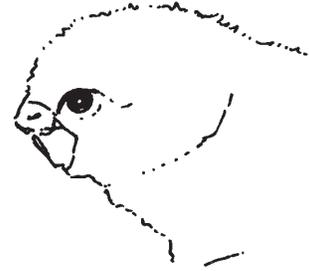
# PREVENTING CANNIBALISM

## POULTRY, LEVEL II

### Member Handout 7, Degrees of Beak Trimming and Anti-Peck Devices

#### BEAK TRIMMING

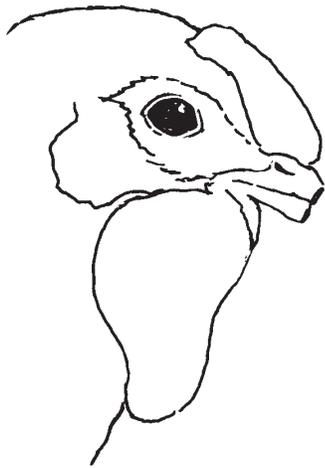
1. Under 10 days



2. During growing period



3. Adult



#### ANTI-PECK DEVICES

1. Specs on laying hen





# The Peck Order

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- To define peck order in chickens
- How the peck order is established
- How the peck order affects the stability and performance of the flocks

#### ABOUT THEMSELVES:

- Their understanding of group dynamics
- How they feel about social and economic status among peers

#### Materials Needed:

- Flock or small group of 6- to 10-week-old birds
- Activity Sheet 6, Peck Order Observations

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### ACTIVITY:

#### Leader Notes

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It has been known for some time that animals and birds form social organizations called **peck orders**. In a well-organized peck order, each bird has a certain **status** which refers to its position or rank in relation to others. The bird's status can be either **dominant** or **subordinate** to others in the flock. Dominance is usually attained initially by **aggression**, or forcefulness. The opposite of aggression is **submission**. Submissive behavior is usually beneficial for smaller, weaker and younger birds because it allows them to live with more aggressive, dominant birds.

Some major observations of the peck order among birds are:

- Aggressiveness is most apparent when birds are competing for something such as food.
- The social structure of a flock can be simple or very complex.
- Birds low on the peck order often get very little feed and water, appear to be nervous and frightened, and, if males, rarely have an opportunity to mate.
- When adult strangers meet, they promptly establish a peck order.
- Although peck orders tend to be rather stable, physiological changes such as molting, can change the peck order in a flock.

Newly hatched chicks are not aggressive, but play fighting or **sparring** gradually appears and is common by the third week after hatching. Males become aggressive earlier than females; peck orders are evident among cockerels by 6 to 8 weeks, and among pullets by 8 to 10 weeks. Typically, male chicks are dominant to females.

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## Leader Notes

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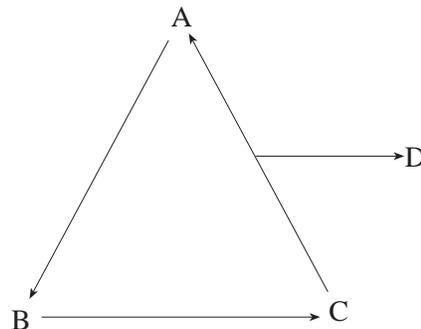
Peck orders may be simple or complex. In very small groups, **linear** peck orders are common and for a group of four could be shown as:



where A pecks B, C and D; B pecks C and D, but is pecked by A; C pecks only D; and D is pecked by all.

Have the youth visit a flock of chickens, preferably ones that are 6 to 10 weeks old, and observe evidence of aggressive or dominant behavior. Use Activity Sheet 6, Peck Order Observations, to record findings.

A more complicated peck order might include a **pecking triangle**, thus:



where A pecks B, B pecks C, C pecks A, and all three in the triangle peck D.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What happened when you observed birds for peck order?
2. Were the aggressive or submissive birds easiest to identify? Why?
3. What behavior did you observe the most?

#### **Process:**

4. What problems did you have in making your observations?
5. Why do you think a peck order occurs in chicks?
6. What is significant about a peck order in free roaming birds as compared to housed or caged birds?

#### **Generalize:**

7. What did you learn about yourself from this activity?
8. How do social or economic levels affect people?

**Apply:**

9. What are the differences in being a group leader or a group member?
10. How might an understanding of how groups work together help you in the future?

**GOING FURTHER:**

- Share your experience with your class or others.
- Individually identify a small group of 6- to 10-week-old birds and observe them to determine their peck order.

**REFERENCES:**

*Poultry Science*, Ensminger

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Economics of Broiler Production

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Meat production strains of chicks
- Pounds of feed it takes to produce a pound of live chick
- Cost of producing a pound of meat

#### **ABOUT THEMSELVES:**

- The importance of responsibility in raising broilers
- The importance of planning, budgeting and record keeping

#### **Materials Needed:**

- Facilities and equipment to raise specified number of broilers (optional)
- Activity Sheet 7, Broiler Production Planning
- Activity Sheet 8, Broiler Budget
- Activity Sheet 9, Broiler Production Record

#### **ACTIVITY TIME NEEDED: 60 MINUTES**

#### **ACTIVITY:**

The intent of this lesson is to help you to raise broilers either for family use or for selling to others. You should have studied several previous lessons about the specifics of caring for day-old chicks.

First, we will consider a few basic questions that must be answered in order to prepare for your broiler project.

Now let's think about planning for the costs involved in producing broilers. We use a budget to help determine if there is at least a possibility of making a profit. As we prepare the budget we must consider production goals. Also, we must consider there will be some fixed costs for equipment, facilities and other variable costs for feed and other materials. Finally, we must consider how much income we can expect to make.

If you decide to actually raise broilers, you will need to keep accurate records to determine if you are within your budget and whether or not you can raise broilers efficiently enough to make a profit.

#### **Leader Notes**

Give each member Activity Sheet 7, Broiler Production Planning. Let members discuss the planning sheet in small groups. Have each group report their findings for total group discussion.

Give each member Activity Sheet 8, Broiler Budget, to discuss in their small groups before reporting back to the entire group. You may want to give members these planning and budget sheets a week prior to this meeting to give them a chance to research some answers from the local community.

Give each member planning to actually raise broilers Activity Sheet 9, Broiler Production Record. Make plans for the members to visit the production locations to observe and discuss the experiences encountered. You may want to visit immediately after chicks are purchased and again in two or three weeks. Compare actual records with budget proposals after birds are sold.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Did you decide to actually raise some chicks? Why? Why not?
2. If you raised chicks, what happened the day you received them?
2. *If you did not raise chicks, what questions in the planning guide helped make this decision? Why?*

#### **Process:**

3. If you raised chicks, what problems did you have? Why?
3. *If you did not raise chicks, how did the budget sheet affect your decision?*
4. If you raised chicks, what responsibilities did you have?
4. *If you did not raise chicks, how did the responsibility for their care affect your decision?*

#### **Generalize:** (Use for either situation)

5. What did you learn from this experience? How will it help you make decisions in the future?

#### **Apply:** (Use for either situation)

6. How will the planning, budgeting and record keeping process be useful in the future?

### **GOING FURTHER:**

- Organize your poultry club to raise broilers as a community project for a club money raising activity.
- Share your experiences by giving presentations to your school class, other members or community groups.
- Consider raising broilers several times a year.

### **REFERENCES:**

#### **Authors:**

Sam Varghese, Extension Specialist, Department of Animal Sciences, Michigan State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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**ECONOMICS OF BROILER PRODUCTION**  
**POULTRY, LEVEL II**  
**Activity Sheet 7, Broiler Production Planning**

1. What hatchery is available or should be used to order chicks from?
  
2. Will you purchase straight run (approximately 50% male and 50% female) or all cockerels?
  
3. What strain of broiler chicks should be ordered?
  
4. What month or date should the project begin?
  
5. What live weight of bird do you plan to sell?
  
6. Will you sell birds live or dressed?
  
7. What types of feeds or rations will be needed?
  
8. Is proper feed available from your local feed store?

\* 9.

\*10.

\* List other questions you might have

**ECONOMICS OF BROILER PRODUCTION**  
**POULTRY, LEVEL II**  
**Activity Sheet 8, Broiler Budget**

A. PERFORMANCE GOALS:	Projections
Average live weight (straight run)	4.0 lb at 7 weeks
Feed conversion	2.1 lb/lb live wt
Dressing yield	73% of live wt
Mortality	4%
B. INVESTMENT:	
Building—use existing building	\$ _____
Equipment—used equipment	\$ _____
TOTAL	\$ _____
C. INCOME:	
Sold Live - ___ lb. live wt./bird	\$ _____
× ___ price/lb. × ___ birds	
Sold Dressed - 73% × ___ lb. live	\$ _____
weight/bird = ___ lb. dressed wt/bird	
× ___ price/lb. × ___ birds	
TOTAL	\$ _____
D. EXPENSES:	
Feed- ___ lb. live wt./bird × ___ feed	
conversion × ___ feed cost/lb. × ___ birds	\$ _____
Interest-equipment ___ initial cost	
× ___ interest rate-	\$ _____
Cost of:	
Chicks	\$ _____
Fuel	\$ _____
Litter	\$ _____
Misc.	\$ _____
TOTAL	\$ _____
E. RETURN TO MANAGEMENT AND LABOR	
(Total Income minus Total Expenses)	\$ _____

**Regulations.** The processing and selling of most poultry meat in Kansas comes under the Kansas Meat and Poultry Inspection Act, which is administered by the Meat and Poultry Inspection Division, Kansas Department of Agriculture, 109 S.W. 9th Street, Topeka, KS 66612 (785-296-3511). Exemptions to the Act are the slaughtering by a person of poultry raised by him/her and used exclusively for use by him/her and members of his/her household and nonpaying guests and employees, and poultry producers with respect to poultry they have raised on their own farms may slaughter and sell not more than 250 turkeys or 1,000 broilers per year if they do not engage in buying and selling poultry products other than those they raised and none such poultry is sold to other than directly to household consumers.

Adapted from *Is Poultry Production a Business for You?*, MF-824, Kansas State University, May 1986.

**ECONOMICS OF BROILER PRODUCTION**  
**POULTRY, LEVEL II**  
**Activity Sheet 9, Broiler Production Record**

**FEED RECORD**

Record the kind, amount and value of feed each time a purchase is made or a quantity of home-raised feed is set aside for the project.

Date	Kind of Feed (grain, mash supplement, etc.)	Quantity of Feed (lbs.)	Cost	Remarks: beginning ration, feed changes, feeding troubles, etc.
Total Feed Costs				

Production Summary

1. Breed of Chicks purchased (circle one) Straight run    Sexed
2. Date project started \_\_\_\_\_ ended \_\_\_\_\_
3. Number days of project \_\_\_\_\_
4. Number of birds started (a) \_\_\_\_\_  
 Number of birds raised (b) \_\_\_\_\_  
 Number of birds that died (c) \_\_\_\_\_
5. Percent death loss (line 4c divided by line 4a × 100)= \_\_\_\_\_ %
6. Pounds of feed used \_\_\_\_\_
7. Pounds of live poultry produced \_\_\_\_\_
8. Pounds of feed to produce a pound of bird (divide line 6 by line 7) \_\_\_\_\_

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## ECONOMICS OF BROILER PRODUCTION

### POULTRY, LEVEL II

### Activity Sheet 9, Broiler Production Record, *continued*

Other Things Learned:

1. What was your brooderhouse temperature? 1st week \_\_\_ 2nd week \_\_\_ 3rd week \_\_\_ 4th week \_\_\_  
5th week \_\_\_ 6th week \_\_\_ 7th week \_\_\_
2. What type of ventilation was used? \_\_\_\_\_
3. What type of heat source was used? \_\_\_\_\_
4. What type of litter was used? \_\_\_\_\_
5. What type of feeder was used? \_\_\_\_\_ How many? \_\_\_\_\_
6. What type of waterer was used? \_\_\_\_\_ How many? \_\_\_\_\_

### FINANCIAL SUMMARY

**Income:**

Date	Items Sold or Used at Home (Indicate Which)	Quantity	Amount
___	_____	_____	\$ _____
___	_____	_____	\$ _____
___	_____	_____	\$ _____
___	_____	_____	\$ _____
Total			\$ _____

**Costs:**

Date	Items Bought, Used, Labor Costs, Value of Home-Grown Products	Quantity	Amount
___	_____	_____	\$ _____
___	_____	_____	\$ _____
___	_____	_____	\$ _____
___	_____	_____	\$ _____
Total			\$ _____

**Summary:**

Total Project Income	\$ _____
Total Project Costs	\$ _____
How Much Money Made or Lost	\$ _____





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# Poultry Furniture

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Equipment needed for a small flock
- Purpose for each piece of equipment

#### **ABOUT THEMSELVES:**

- Equipment needed for their health and safety
- Equipment (or furniture) they have that makes life easier or more comfortable, but is not necessary

#### **Materials Needed:**

- Several poultry equipment catalogs
- Samples of small flock equipment (optional)
- Activity Sheet 10, Poultry Furniture
- Activity Sheet 11, People Equipment-Furniture

#### **ACTIVITY TIME NEEDED: 45 MINUTES**

#### **ACTIVITY:**

There are many different feeders and waterers that can be used in the poultry house. You have equipment for small flocks and equipment for large flocks. The equipment is very different for each situation.

Compare the different styles of feeders, waterers and other equipment. Notice the wide range of equipment that is available to a producer.

Make a list of the equipment you would need for a small farm flock on the Activity Sheet, Poultry Furniture. List the function or purpose of each piece of equipment. Discuss what equipment is necessary and what is convenient or makes caring for the flock easier.

Next, use Activity Sheet, People Equipment-Furniture, to list all the pieces of equipment that are necessary for your health and safety, plus other items that you have that make life easier or more fun, but are not necessary.

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#### **Leader Notes**

Obtain an equipment catalog that has a selection of different equipment. You should have more than one catalog as small flock equipment will be in a different catalog than large commercial equipment. Your local K-State Research and Extension agent may be able to help you acquire the necessary catalog.

Hand out Activity Sheet 10, Poultry Furniture. Let two or three members work together. Have each group discuss their lists.

Discuss the difference between necessary and nice or convenient. Have members circle five to 10 items needed most.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was unique about your list of poultry equipment? What items did everyone list?
2. What portion of the items was necessary?

#### **Process:**

3. Why is size of equipment important?
4. Did you consider purchasing any equipment strictly for convenience? Why? Why not?

#### **Generalize:**

5. What did you learn about equipment or furniture in your house?
6. Which list of furnishings was longer, necessary or nice? Why?

#### **Apply:**

7. How did you decide what was really necessary?
8. How will you act differently in the future a result of this activity?

### **GOING FURTHER:**

- Compare differences in equipment needed for a large commercial producer and a small farm flock.
- Compare differences in equipment and housing for baby chicks as opposed to a laying house.
- Discuss confinement versus free roam egg production.

### **REFERENCES:**

*Management of a Small Flock of Poultry*, Kansas State University, C-507

### **Author:**

John Struwe, Extension Assistant, University of Nebraska–Lincoln; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Types of Poultry Housing

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- To identify several types of poultry housing
- To match age and type of bird with proper housing type

#### **ABOUT THEMSELVES:**

- Differences in human housing in their community and around the world
- Their feelings about housing or room needs for various ages of people

#### **Materials Needed:**

- Magazines, catalogs, library books and other pictures of different types of poultry housing
- Pictures of human houses from around the world
- Scissors, glue, scrapbooks

#### **ACTIVITY TIME NEEDED: 60 MINUTES**

#### **ACTIVITY:**

There are many examples of poultry housing. They all have the same function; that is, to provide shelter and a healthy environment for the birds, as well as a pleasant environment for the caretaker. Some are very elaborate and others are simple, depending on the purpose.

Collect pictures of poultry houses from magazines and catalogs or make photocopies from library books. Paste your pictures in a scrapbook and arrange them by type of house and/or age and type of poultry they are best suited for.

#### **DIALOGUE FOR CRITICAL THINKING:**

##### **Share:**

1. How many different types of poultry houses did you find?
2. What were the similarities and differences of most poultry houses?

##### **Process:**

3. What were some of the major features of poultry housing? Why?
4. What are the differences between housing for young chicks as compared to laying hens?

#### **Leader Notes**

Assist members by providing magazines, catalogs, etc., with poultry and human housing pictures.

**Generalize:**

5. What features do you feel are needed in houses for people?
6. What housing features are needed in extremely cold climates as compared to extremely hot climates?

**Apply:**

7. How do housing needs change for young children as compared to senior citizens?
8. How will you act differently in the future as a result of this activity?

**GOING FURTHER:**

- Exhibit your scrapbook at the county fair.
- Give a talk to your school class about poultry and human housing around the world.
- Tour poultry facilities of different types in your area.

**REFERENCES:**

*Egg Industry*, *Broiler Industry*, and *Turkey World* magazines, Watt Publishing Co, 122 S. Lesley, Morris, Illinois 61540

**Author:**

John Struwe, Extension Assistant, University of Nebraska–Lincoln; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# How Birds Adapt to Their Environment

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- How birds respond to changes in their environment
- How the environment affects productivity and the quality of eggs and meat
- What people do to help birds adapt to their environment

#### **ABOUT THEMSELVES:**

- How their body adjusts to changes in temperature, humidity, air movement and light
- What humans do to make their environment more comfortable
- The environmental factor that affects their comfort the most

### Materials Needed:

- Member Handout 8, Exterior Views—Modern Poultry House
- Member Handout 9, Interior Views—Modern Poultry House

**ACTIVITY TIME NEEDED:** 30 MINUTES

### ACTIVITY:

### Leader Notes

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Adequate protection of poultry from extreme changes in their environment is necessary for their welfare and productivity. Modern poultry housing has enabled man to better control the environmental conditions surrounding poultry, making it possible to attain high productivity regardless of the external, or outside, environment surrounding the birds. Improving the birds' environment also allows the caretaker to be more comfortable while taking care of the birds. The main environmental factors birds have to adjust to are **temperature, humidity, air flow and light**.

#### **Temperature**

The fowl is constantly losing heat to its environment because its normal body temperature of 105° to 107°F is usually higher than the air temperature. In addition to the heat produced by the bird, additional heat is added to the bird's environment by the sun, artificial sources such as brooder stoves and the decomposition of manure and litter in the house. The most comfortable temperature range for fowl depends on the species, age and size of the bird. For example, because a baby chick is small and has a very thin feather coat, it needs a temperature of 95°F during the first week of its life. In contrast, a laying hen that has a full coat of feathers is most comfortable in a temperature range of 65° to 80°F.

---

## Leader Notes

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Have members compare how they adjust to temperature changes with how birds adjust.

### **How birds adjust to temperature changes.**

#### **Cold Weather**

Fluff feathers  
Eat more feed  
Huddle together to share heat  
Increase activity

#### **Hot Weather**

Spread wings  
Eat less feed  
Lay on cool surfaces such as the ground  
Decrease activity  
Drink more water and pant

Reduced feed consumption reduces egg production and growth; increased feed consumption increases the cost of producing eggs and meat.

### **Humidity**

Birds tolerate a wide range of humidity. For birds on litter, a humidity level below 30 percent may result in excess dust. Humidity above 75 percent may cause wet litter. High humidity during hot weather reduces the ability of birds to cool themselves by panting. During cold weather, high humidity makes the birds more uncomfortable.

### **Light**

Light striking the head of the bird triggers responses that influence reproduction, growth and behavior. The trigger for this stimulation is the amount of light (daylength) per 24 hours. Short daylengths (8 to 10 hours) or decreasing daylengths while birds are growing delays sexual maturity; increasing daylengths stimulates sexual maturity. A 14- to 17-hour day is required for optimum egg production. The intensity of the light that is needed varies between species. Birds respond more to the red end of the light spectrum than the blue-green end.

### **Ventilation**

Air movement is an important part of a bird's environment. It provides oxygen to the birds and removes toxic gases such as carbon dioxide and ammonia, removes dust particles from the air, dilutes the microorganisms in the air, and regulates the temperature and humidity of the air.

Give members Member Handouts 8 and 9, Exterior Views—Modern Poultry House and Interior Views—Modern Poultry House. Have members list features that modify the bird's environment. Have members compare these features to those found in their environment.

### **Examples of how humans help birds adapt to their environment.**

#### 1. Temperature:

- Insulation of poultry houses
- White roof surface to reflect heat
- Increase air flow during hot weather and decrease during cold weather
- Spray birds or house with water during hot weather
- Shade for birds in outdoor pens
- Cool water for birds during hot weather
- Supplementary heat for young birds

#### 2. Humidity:

- Reduce water spillage
- Ventilation to remove moisture from house

### 3. Light:

- Low light intensity in light-tight houses to discourage cannibalism
- Blue lights when catching broilers because humans can see better in blue light than birds
- High light intensity to discourage broodiness in breeding turkeys
- High light intensity to stimulate day-old birds to eat and drink; particularly important for poults because of poor eyesight at hatching
- Night lights during hot weather to stimulate feed consumption

### 4. Ventilation:

- Fans to supplement natural ventilation
- Increase air flow during hot weather, decrease during cold weather

## **DIALOGUE FOR CRITICAL THINKING:**

### **Share:**

1. What are the main environmental factors that affect birds?
2. Which environmental factor was easiest or most difficult to understand? Why?

### **Process:**

3. Which environmental factor do you think is most significant?
4. What environmental factor would be the most important for chicks? Laying hens?

### **Generalize:**

5. Which environmental factor is most critical for you? Why?
6. What environmental factor is easiest to control in your house? Why?

### **Apply:**

7. How will understanding your environment help in the future?

## **GOING FURTHER:**

- Make arrangements to tour a modern poultry house.

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## Leader Notes

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### REFERENCES:

*Poultry Housing for Layers*, North-Central Region Publication 183  
*Poultry Science Manual*, Department of Animal Sciences and Industry,  
Kansas State University  
*Poultry Science*, Ensminger

### Author:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

**Think Back:** (record on a separate sheet)

What are the main environmental and economic features to consider when raising poultry?

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Poultry Leaders Notebook, Kansas State University, May 1998.

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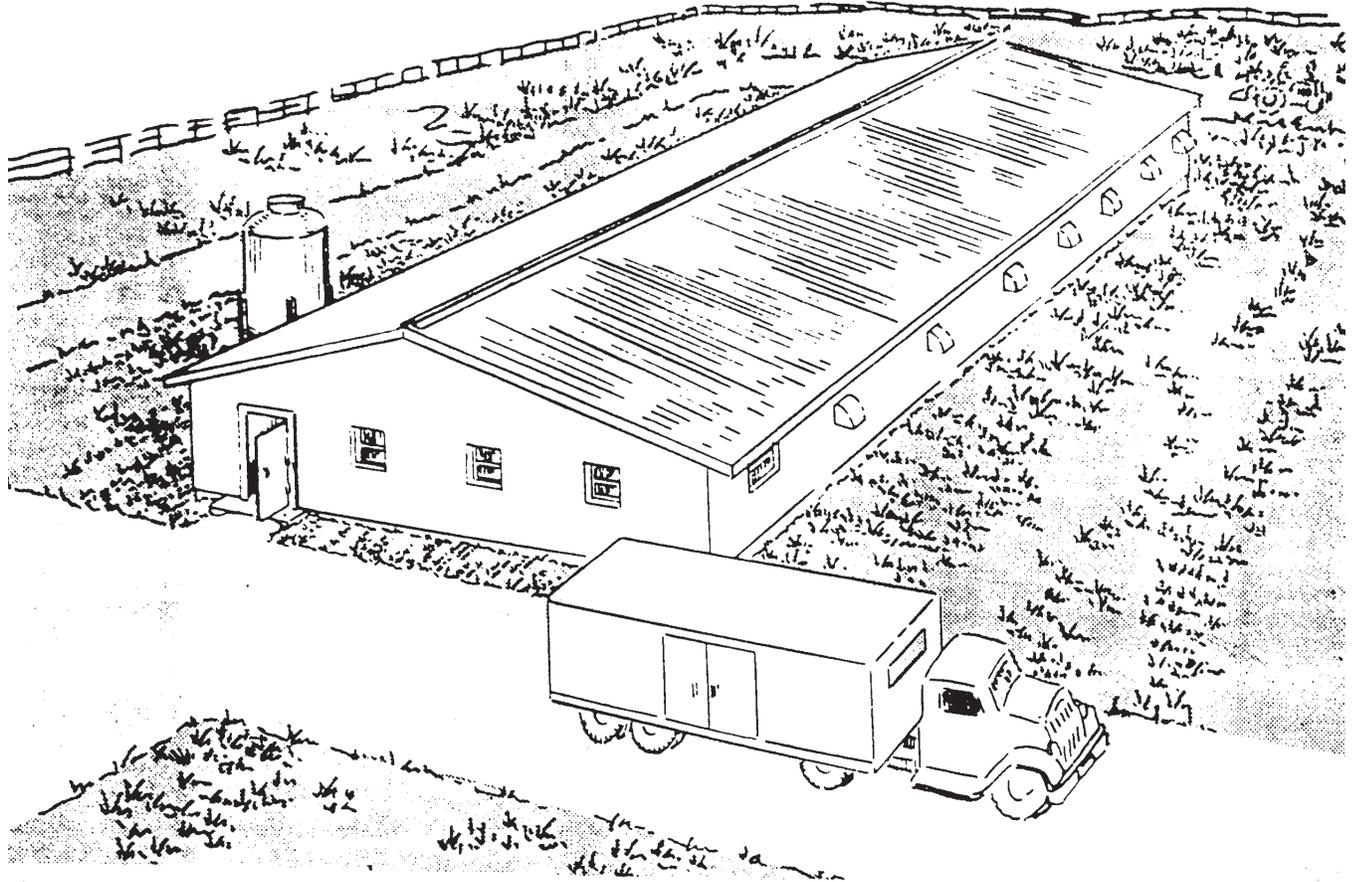
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## HOW BIRDS ADAPT TO THEIR ENVIRONMENT

### POULTRY, LEVEL II

#### Member Handout 8, Exterior View—Modern Poultry House



The control of environmental extremes in poultry housing has produced drastic changes in management systems for laying hens. The number of birds per foot of house has been doubled with reduced stress on the birds, increasing both quality and quantity of eggs.

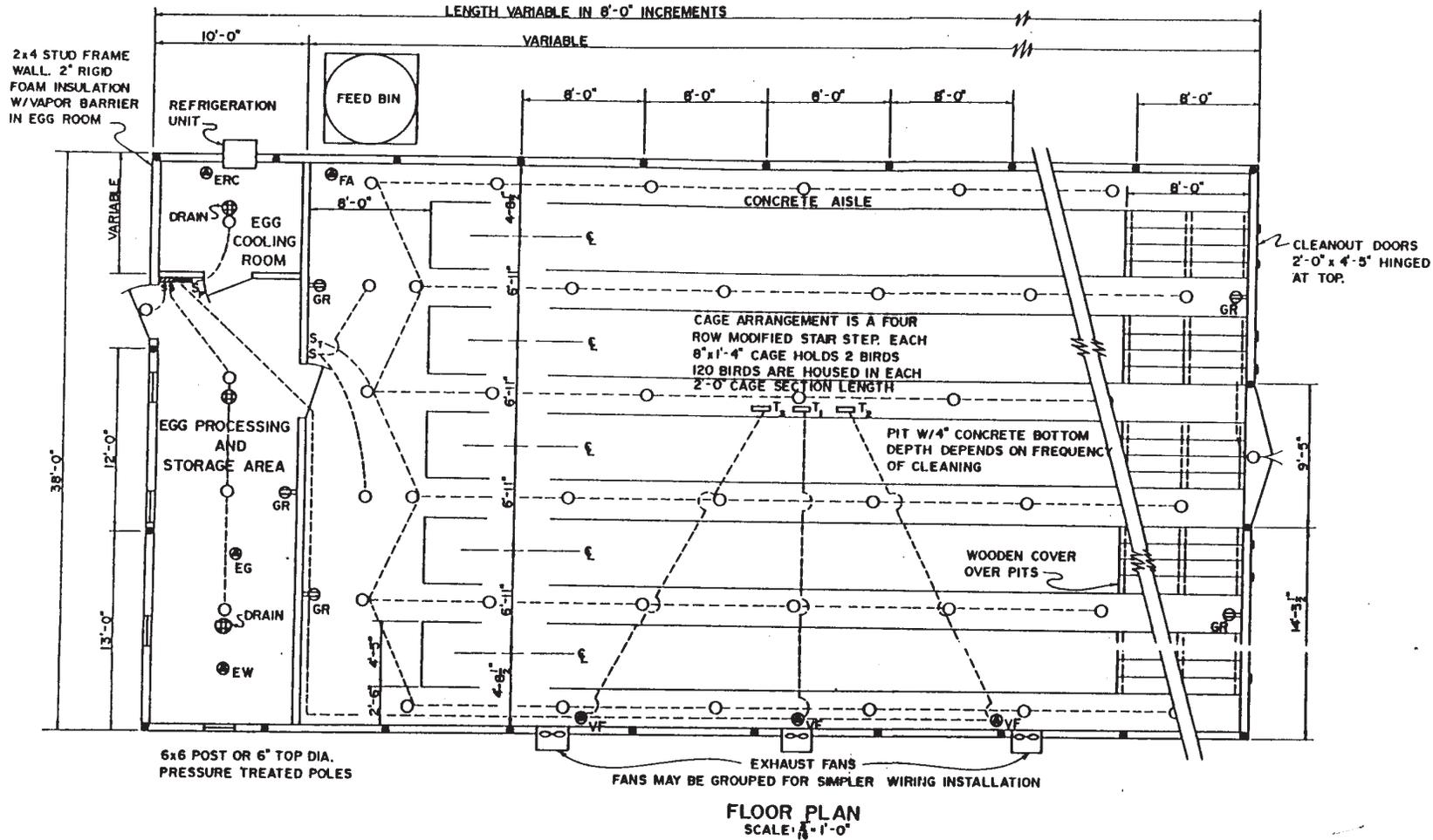
This insulated, windowless, 38-foot wide house has a capacity of 60 birds per foot length. The length can be varied in increments of 8 feet according to the size of flock desired and the maximum capacity of the mechanical equipment installed.

Positive ventilation is provided by thermostatic controlled exhaust fans. A continuous adjustable inlet, under the eaves, can be adjusted to direct incoming air along the ceiling in cold weather or along walls and ceiling in warm weather.

# HOW BIRDS ADAPT TO THEIR ENVIRONMENT

## POULTRY, LEVEL II

### Member Handout 9, Interior View—Modern Poultry House



94-Poultry, Level II

#### Electrical

- Lighting Outlet
- ⊕ Duplex Convenience Outlet Grounded
- ⊕ GR Special Purpose Outlets
- EG—Egg Grader
- EW—Egg Washer
- ERC—Egg Room Cooler
- FA—Feed Bin Auger
- VF—Ventilation Fan
- S SPST Switch
- S<sub>p</sub> SPST Switch w/Pilot Light
- S<sub>T</sub> SPDT Time Switch (230 Volts)
- T<sub>1</sub> Low Volume Thermostat
- T<sub>2</sub> Medium Volume Thermostat
- T<sub>3</sub> High Volume Thermostat

- Distribution Panel—(Fuse or Circuit Breaker)
- ▨ D.P.D.T. Service Entrance Switch for Use With Stand—by Generator

#### Notes:

1. All permanent wiring should comply with the national electric code and any other local codes in authority.
2. Non-metallic wiring, switches, lampholders and receptacles are recommended. (See nec art. 336-3)
3. 1/2 hp or larger motors should be connected to 230 volts.
4. Lighting circuits should be equally divided on 115-volt sides of the service to balance load on system. Ampere load on any circuit should not exceed 80% of the rating.

5. Incandescent lamps, rated at 110 to 120 volts and 25 watts on 10-foot centers, are recommended for use with light-colored ceilings or with shallowdom reflectors. Lamps should not be more than 6 feet above the lowest feeder or provide at least 1 foot candle minimum intensity for birds in lowest cages.
6. Consult with equipment manufacturer for details and dimensions of cages and other equipment.

#### Specifications:

1. The design is expandable in 8-foot sections of length and is 38 feet wide.
2. The windowless, clear span building uses trusses 4 feet O.C. with cages hanging from bottom chord of trusses.

3. Three inches of insulation are used in the ceiling and 2 inches are used in walls.
4. The egg cooling room uses 2 inches of rigid foam insulation.
5. The design is for either frame or post construction, with metal roof and siding.
6. The ventilation system uses exhaust fans and adjustable slot inlets.
7. The manure is removed frequently by a scraper and deposited in a loader or storage area.

Based on: West Virginia University Plan PO-123



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# Types of Feathers and Their Functions

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The four basic parts of a feather
- Basic structural parts of a feather
- The three types of mature bird feathers
- Three types of feathers according to location

#### ABOUT THEMSELVES:

- The importance of feathers in their everyday life

#### Materials Needed:

- Magnifying glasses
- Samples of feathers or live chickens
- Member Handout 10, Parts of a Feather
- Member Handout 11, Types of Feathers and Location
- Member Handout 12, Feather Locations

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

### Leader Notes

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Birds, like all vertebrates, have a skeleton, a backbone and two pairs of limbs. The most distinguishing feature that is unique to birds are their feathers. Feathers are appendages of the skin. They may vary from soft down feathers that lie close to the body to body feathers and flight feathers. The down feathers help keep the bird warm. Body feathers follow the shape of the bird's body. The large feathers in the wing and tail are called flight feathers. Chickens also have hairlike feathers. At least once a year birds shed (**molt**) their feathers.

Feathers of a bird serve several different functions such as regulation of temperature, flight and protection. They also can be used to identify secondary sex characteristics. Feathers come in many shapes, sizes and textures. There are different kinds of feathers such as flight, fluffy and male- and female-type feathers. Feather appearance differs between the sexes in the neck, back, saddle and tail sections. In these areas, the tips of the male's feathers are pointed while those of the female are rounded.

At hatching, baby chicks are covered by down feathers that are soft, fine and fluffy. These feathers are quickly replaced by several coats of coarser type feathers, as the bird matures. When we look at a feather we can see that it has four distinct parts: the **quill, shaft, fluff and web.**

Give each member a feather or have them draw a picture of a feather and label the four basic parts.

The basic structure of feathers is the same in all birds. The **shaft** (or stem), which projects from the skin, is often hollow filled only with spongy

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## Leader Notes

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Point these structural features out by using a magnifying glass on real feathers or show the diagram on Member Handout 10, Parts of a Feather. Try smoothing a ruffled feather with your fingers and you will see the effect.

Let members identify these feather types on a live chicken or provide them with samples for a collection. Give the Member Handout 11, Types of Feathers and Locations, as a take-home review.

Pass out the Member Handout 12, Feather Locations, as a guide for additional study.

keratin. (Keratin is the horny substance of which the feather is made). There are many branches along either side of the shaft that form a flat surface called the **vane**, which is made up of barbs, barbules and hooklets. The **web** is formed by barbs, that are made up of rows of smaller branches, called barbules. The barbs are all the same, except perhaps for some variation in length, but the barbules differ according to the side of the barb from which they branch. Those pointing toward the tip of the feather bear hooklike projections, while those pointing toward the feather base are curved and hence may be called bow barbules. The barbules interlock with other barbs and help form a continuous smooth-looking appearance. If the connection should be broken they can easily be hooked together again. The **fluff** is a series of barbs which have no barbules. The side branches of the barbs are short and threadlike.

The feathers of an adult can be classified into three types: (1) **contour feathers**, (2) **plumules** and (3) **filoplumes**. **Contour feathers** are the outermost feathers. These feathers vary a lot in both length and thickness. They range from the larger and stiffer primary and secondary flight feathers and the tail feathers to the softer and more delicate feathers that cover the body and give it shape.

The **plumules** or down feathers make the underplumage of the bird. Each of these feathers has a quill and a soft head of fluffy branches because the barbules radiate freely and are not interlocked like they are in the contour feathers. This type of feather is often plucked from the breast to line the nest and keep the eggs warm. In certain species, such as the goose, these down feathers are gathered commercially to produce the lining for sleeping bags, coats, etc.

The **filoplume** feathers have a short, flexible, hairlike shaft with barbs that are confined to the tip of the feather. These are much smaller in size than the other feathers and stand up like hairs and are easy to observe if you look at a plucked chicken.

Feathers are also named according to their location on the bird's body and also by function. There are usually 10 flight feathers on the outer part of the wing, called the **primaries**. Often, these are sharply pointed and asymmetric with a very narrow outer vane. The flight feathers next to the body are called **secondaries**. They have inner and outer vanes of almost equal size. The secondaries vary greatly in number depending on the length of the wing. **Covert** feathers shape the wing profile and generally insulate and protect the wing. **Contour** feathers is the name given to those on the body. We can guess the function of the down feathers from their use in sleeping bags and quilts. These are also feathers which serve chiefly for decoration and display.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What are some of the differences you see in feathers?
2. What differences are there in how feathers feel?

**Process:**

3. What are the four basic parts of a feather?
4. What are some functions of feathers?

**Generalize:**

5. What do people use feathers for?
6. Why have some feather substitutes been used?

**Apply:**

7. What do you think is the commercial value of feathers?
8. How will you act differently in the future as a result of your increased knowledge of feathers?

**GOING FURTHER:**

- Examine feathers from different species or breed varieties and compare.
- Visit a poultry show and observe the different types of feathers on different species and breeds.
- Research additional uses of feathers that benefit humans.

**REFERENCES:**

*Structure and Function of Domestic Animals*, W. Bruce Currie  
*The Standard of Perfection*, American Poultry Association, 26363 S  
Tucker Road, Estacada, Oregon 97023  
*Poultry Science*, Ensminger  
*Poultry Science*, Adams

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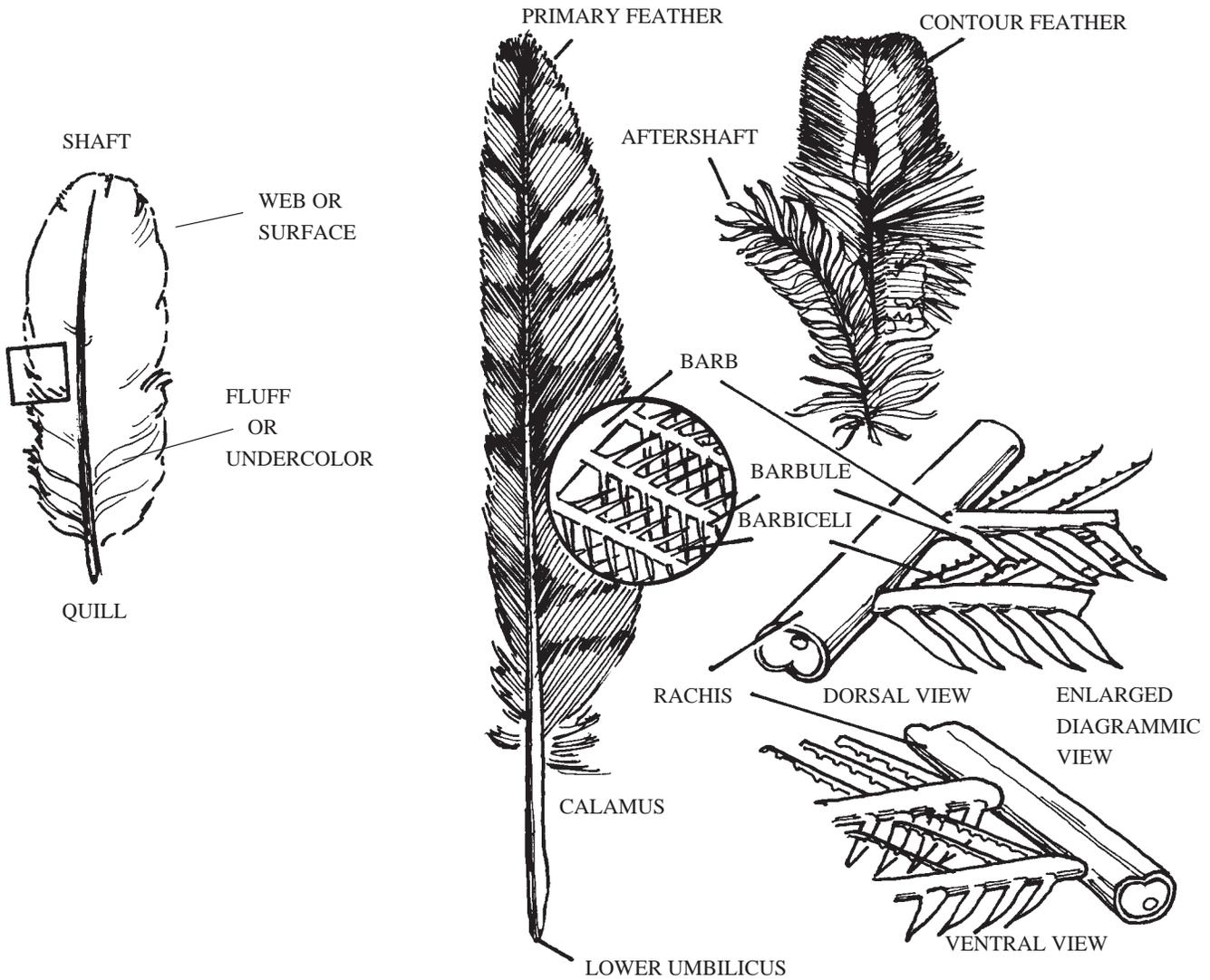
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# TYPES OF FEATHERS AND THEIR FUNCTIONS

## POULTRY, LEVEL II

### Member Handout 10, Parts of a Feather



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# TYPES OF FEATHERS AND THEIR FUNCTIONS

## POULTRY, LEVEL II

### Member Handout 11, Types of Feathers and Locations

#### Types of Feathers (Mature Bird)



**Contour**

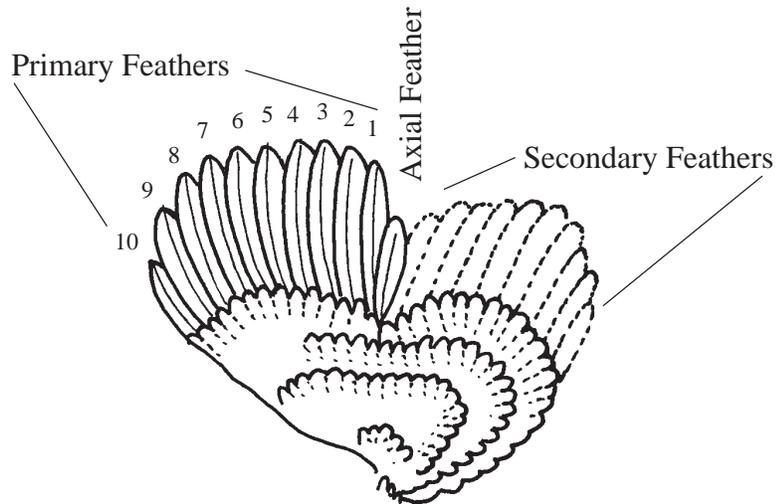


**Plumules**



**Filoplumes**

#### Types of Feathers (Based on Location)



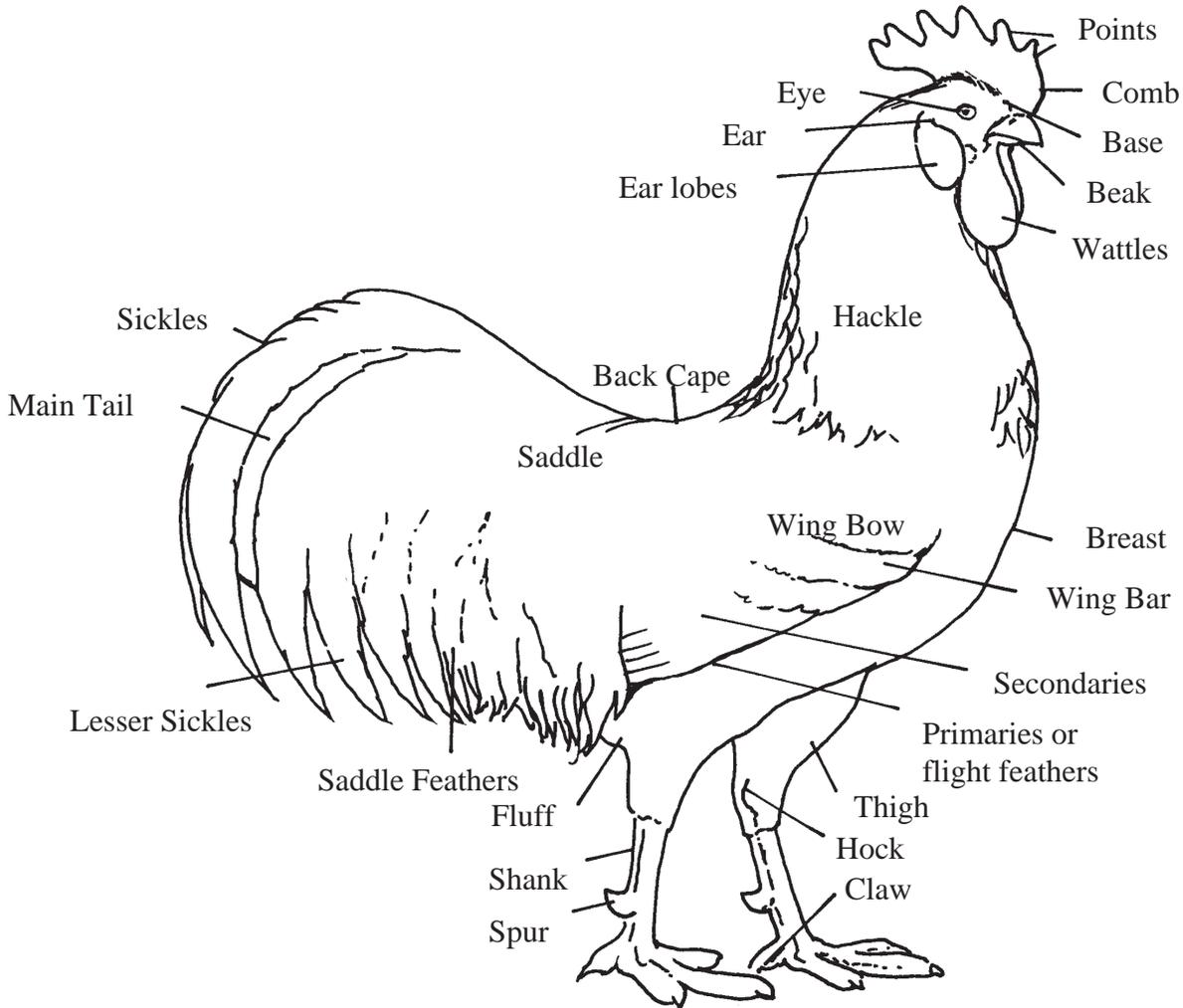
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# TYPES OF FEATHERS AND THEIR FUNCTIONS

## POULTRY, LEVEL II

### Member Handout 12, Feather Locations





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# Feather Colors and Patterns

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Five types of feather patterns
- How feather patterns can be used to identify the breeds and varieties of chickens

#### ABOUT THEMSELVES:

- The significance of various patterns in their life

#### Materials Needed:

- Samples of feathers—the seven patterns discussed below (if possible)
- Pencils
- Activity Sheet 12, Standard Feather Patterns
- Leader's Key, Activity Sheet 12, Standard Feather Patterns

#### ACTIVITY TIME NEEDED: 30 MINUTES

#### ACTIVITY:

Feathers come in many different colors and have a variety of patterns, which help distinguish between breeds and varieties. Some of these patterns are: **penciled, spangled, mottled, laced, barred, striped or tipped.**

Common feather colors are white, black, red and buff. The different feather patterns usually contain two or more different colors. In some breeds or varieties of chickens, such as the New Hampshire Red and Brown Leghorn, the male has more brightly colored feathers than the female.

**Penciled** patterns are narrow markings, uniform in width, sharply defined and continue in an unbroken line following the contour of the feather. A **spangled** feather pattern is a distinct marking of a contrasting color at the tip of each feather, forming a V-shape with a rounded end. **Mottled** feathers are similar to spangled feathers, except that the markings are always white and found on a variable percentage of feathers, not all of them. **Laced** patterns have a border of contrasting color around the entire web of a feather. The border is usually narrow and uniform in width. The **barred** pattern describes alternate colored crosswise markings on a feather. **Striped** color patterns have a stripe which extends through the web and runs parallel with the outer edges of the feather and tapers to a point near the lower end of the feather. **Tipped** feathers have white markings at the tips of feathers in mottled and spangled breeds.

#### Leader Notes

Hand out Activity Sheet 12, Standard Feather Patterns. You can have members complete the matching exercise prior to the explanation of the color patterns or have them fill in their sheets as you go. Have members try to identify the patterns on real feathers.

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## Leader Notes

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### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What color patterns did you see in the feathers you had?
2. Which pattern was the most difficult to identify? Why?

#### **Process:**

3. Why are feather patterns important?
4. What feather patterns are most common? Why?

#### **Generalize:**

5. What other things have significant color patterns? Why?

#### **Apply:**

6. How important do you think patterns will be in the future? (Try to list examples)

### **GOING FURTHER:**

- Examine feathers from different species and compare.
- Visit a poultry show and observe the different colors and color patterns of the different breeds and varieties.
- Make a display of feather color patterns to share with your club or classroom.
- Develop a collection of feathers.
- Go to an art or craft show and view uses of feathers.

### **REFERENCES:**

*Structure and Function of Domestic Animals*, W. Bruce Currie  
*The Standard of Perfection*, American Poultry Association, 26363 S  
Tucker Road, Estacada, Oregon 97023  
*Poultry Science*, Ensminger

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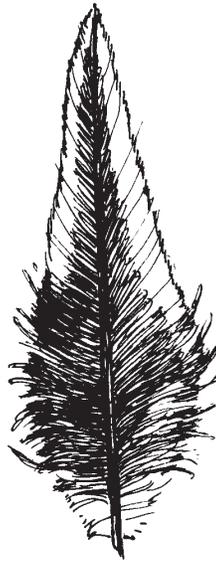
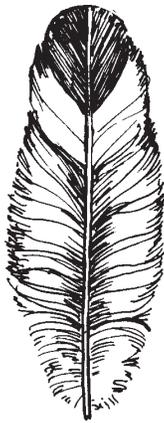
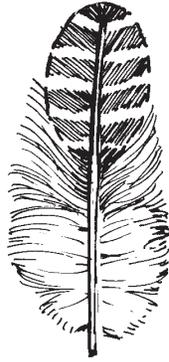
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**FEATHER COLORS AND PATTERNS**  
**POULTRY, LEVEL II**  
**Activity Sheet 12, Standard Feather Patterns**

Draw a line from the name of the feather pattern to the correct picture.



Penciled

Spangled

Mottled

Laced

Barred

Striped

**Think Back:**

What is the value of feathers in your life? Why?

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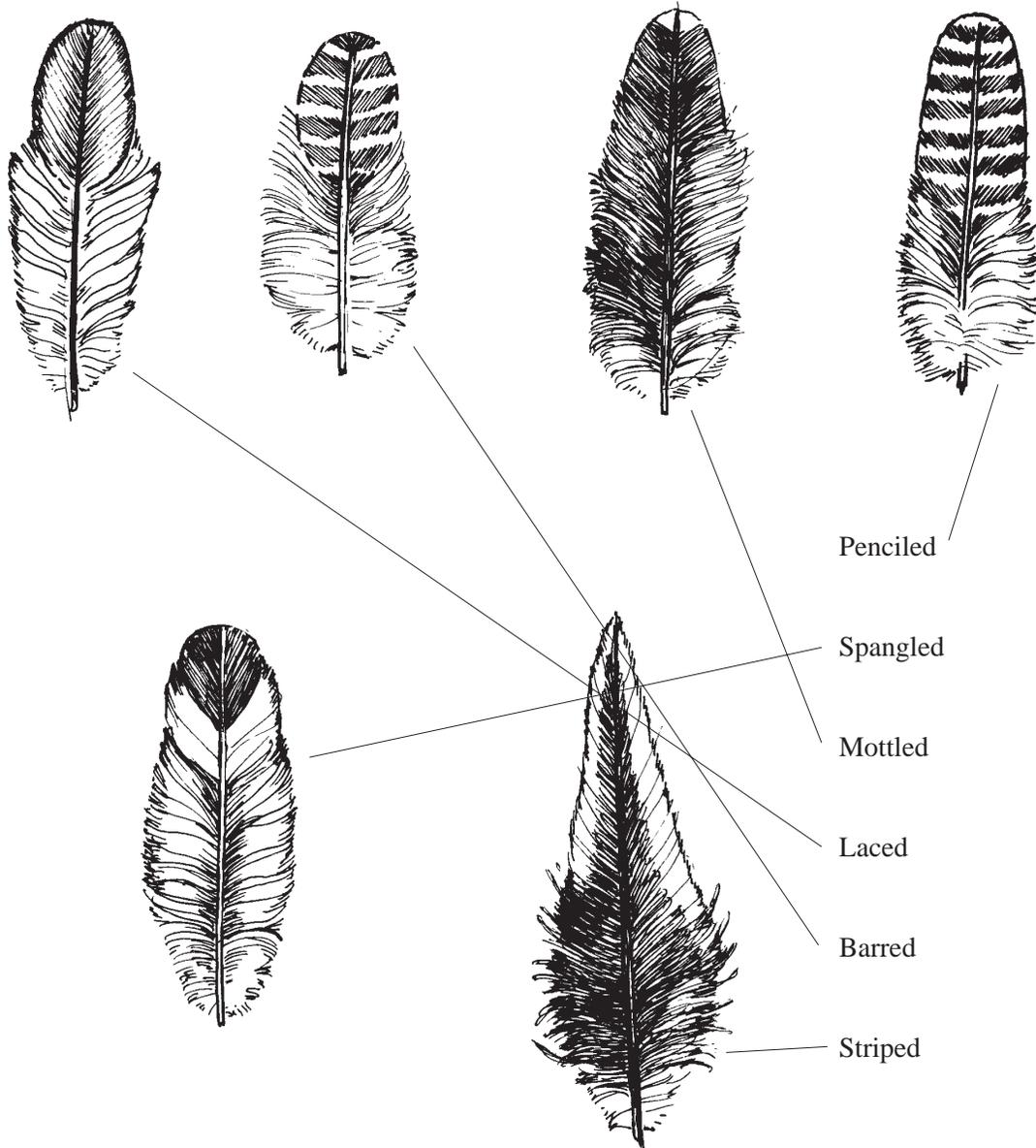
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## FEATHER COLORS AND PATTERNS

### POULTRY, LEVEL II

#### Leader's Key, Activity Sheet 12, Standard Feather Patterns

Draw a line from the name of the feather pattern to the correct picture.







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# Talking Like a Poultry Raiser

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT

- To define and use 20 common poultry terms in sentences

#### ABOUT THEMSELVES:

- Their preferred learning method
- Their feelings about learning specific terminology for hobbies or a career

#### Materials Needed:

- List of terms and definitions

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### ACTIVITY:

Understanding various poultry terms helps members expand their knowledge of poultry production and products. Whether a member is judging a class of chickens or eggs, reading about poultry, or simply talking with others, the ability to use correct terms will be very helpful.

**Quiz Bowl**—Definitions make excellent questions for quiz bowl use. To hold a quiz bowl, divide the members into two teams, read a definition or term to the teams, and give the team answering it correctly a point.

**Drawing**—Many of the terms can be understood more clearly by having your members make a drawing of what they think it means. Have them explain their drawings or sketches to each other.

**Charades**—Your members will enjoy acting out many of the terms as the rest of the group tries to figure out the term. To play charades, hand out or have them draw terms and let them take turns doing a charade.

#### Poultry Terms

Here are some terms that are used in describing and working with poultry and poultry production. Some uses are quite general and others are more specific. Quite a few terms you hear will be used only by the poultry judge or raiser of exhibition poultry. Some terms which have specific meanings for producers of waterfowl and turkeys are included in a separate list.

**Avian**—relating to or pertaining to birds.

**Axial feather**—the short feather in the middle of the wing that separates the primary feathers from the secondary feathers.

#### Leader Notes

Preparation for this meeting depends on the type of activity you select and whether you use poultry terms as the only topic for the meeting. Read the activities and select one or a combination of two or three. Included in this guide is an alphabetical list of general poultry terms and terms related to domestic waterfowl and turkeys.

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## Leader Notes

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**Bantams**—miniature chickens, usually one-fourth to one-fifth the size of regular chickens.

**Barring**—two alternating colors on a feather, running across its width.

**Bird**—an individual of any avian species.

**Blade**—the portion of a single comb below the points.

**Bow-Legged**—a deformity in which the legs are farther apart at the hocks than at the feet.

**Brassiness**—the light yellowish metallic cast commonly found in the plumage of white or partly white varieties.

**Breed**—a group of chickens within a class with a distinctive body shape and having the same general feathers and body weight.

**Broody**—the characteristic of birds to develop motherly instincts for setting on eggs and brooding chicks.

**Candling**—examining the contents of an egg by holding it up to a light source in a darkened room.

**Capon**—a castrated male chicken, usually processed at about 5 months of age for meat purposes.

**Carriage**—the posture of the bird.

**Chalaze**—white, twisted, cord-like structures which hold the yolk in the center of the white of an egg.

**Class**—a group of chickens that has been developed in a particular region of the world.

**Close Feathered**—feathers held tight to the body.

**Cockerel**—a male chicken under 1 year of age.

**Comb**—the fleshy protruding part on top of the head of a fowl.

**Condition**—the state of a bird's health, including sufficient fleshing and cleanliness and brightness of plumage.

**Cornish Game Hen**—an immature chicken, usually processed at 5 to 6 weeks of age, from one of the Cornish meat-type crosses. Cornish game hens weigh no more than 2 pounds ready-to-cook.

**Coverts**—the feathers covering the base of the primary and secondary wing and main tail feathers.

**Crest**—a round tuft of feathers on the top of the head of some chickens and ducks.

**Crop**—the enlarged part of the gullet, between the neck and body, in which food is stored temporarily and softened for digestion.

**Crossbreed**—the offspring of parents of different breeds

**Crow Head**—a narrow, shallow head with an abnormally long beak.

**Culling**—removing unproductive or inferior birds from the flock.

**Cushion**—a mass of feathers over the back and base of the tail of a chicken, giving it a rounded effect.

**Cuticle**—a protective covering over the shell of the egg which partially seals the pores and makes the shell more water-resistant.

**Debeak**—the removal of part of the beak of birds to reduce picking and egg eating.

**Defect**—a fault that is considered in judging poultry.

**Disqualification**—a serious deformity or a defect which prevents a bird from receiving an award.

**Down**—the soft, fine, fluffy covering of a young bird.

**Dubbing**—trimming the comb and/or wattles.

**Earlobe**—a round, fleshy patch of bare skin on each side of the head, varying in size, shape and color according to the breed.

**Embryo**—the developing bird within the egg.

**Eviscerate**—to remove the contents of the body cavity when processing poultry.

**Fowl**—a collective term applying to chickens, ducks, geese, turkeys and sometimes other avian species. Also a marketing term used for mature chickens.

**Fryer (Broiler)**—a young, meat-type chicken, usually processed at 7 to 10 weeks of age.

**Giblets**—the heart, liver and gizzard of poultry when used for meat.

**Hackle**—the rear and side neck feathers of a bird.

**Hen**—a female of many avian species. Also a female chicken over 1 year of age.

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## Leader Notes

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***Hen-Feathered***—a male having oval instead of pointed sex feathers in the hackle, saddle, wingbow and sickles.

***Hock***—the joint between lower thigh and shank.

***Horn***—a term used to describe the various shades of dark color in the beak of some breeds such as the Rhode Island Red.

***Incubation***—applying heat to eggs to cause them to hatch.

***Keel***—the lower portion of the breast bone.

***Lacing***—a narrow border of contrasting color around the entire web of a feather.

***Leg***—the upper and lower thigh and shank in the live bird. The thigh and drumstick in processed poultry.

***Lopped Comb***—a comb which falls over to one side.

***Luster (Sheen)***—a glossy appearance to the feathers, due to the reflection of light rays.

***Molt***—the process of shedding old feathers and regrowing new ones.

***Mottling***—spots of a color or shades different from the base color of the feather.

***Oil Gland***—a gland on the back at the base of the tail that secretes an oily fluid used in preening the bird's feathers.

***Ovary***—the part of a hen's reproductive system that produces the female germ cell and the yolk of the egg.

***Oviduct***—the part of the hen's reproductive system that produces the white, shell membranes and shell of the egg.

***Plumage***—the collective term for the feather covering of a bird.

***Poultry***—a general term applied to all domesticated fowl.

***Primaries***—the long, stiff feathers growing from outer segments of the wing.

***Pubic Bones***—the thin, rear portion of the hip bones that form part of the pelvis.

***Pullet***—a female chicken less than 1 year old.

***Roach Back***—a deformed, humped back.

**Roaster**—A young, meat-type chicken, usually processed at 3 to 4 months of age.

**Saddle**—the rear of the back of a male fowl.

**Scales**—the thin, horny growths covering the shanks and feet.

**Secondaries**—the long, stiff wing feathers growing from the wing segment next to the primaries.

**Sex Feathers**—the pointed feathers in the hackle, back, saddle, sickles and wingbow of a male fowl. In females, these sex feathers are oval.

**Shank**—the portion of the leg between the hock joint and the foot.

**Sickles**—the long, curved feathers of a male chicken's tail.

**Side Sprig**—a pointed growth on the side of a single comb.

**Slipped Wing**—a wing that is carried so the primary feathers do not overlap properly when folded.

**Split Wing**—a wing with a distinct gap between the primary and secondary feathers, due to the permanent absence of a feather.

**Spurs**—a bony growth from the rear inner side of the shanks.

**Standard Fowl**—the large or regular-sized breeds of poultry.

**Strain**—fowl of any breed or variety that have undergone a breeding and selection program for a number of years so they reproduce with uniform characteristics.

**Stub**—a short feather, usually found on the shanks, or on or between the toes.

**Texture**—the condition or size of the grain and quality of the skin of the comb, face, wattles and earlobes.

**Thumb Print**—a disfiguring indentation on the blade of a single comb.

**Ticking**—specks or small spots of color in contrast to the base feather color. Ticking can be required on some portions of some breeds, but it may cause disqualification in others.

**Type**—the general shape and form common to all fowl in a breed.

**Undercolor**—the color of the lower or fluff portion of feathers.

**Variety**—a subdivision of a breed, distinguished by color, color pattern or comb type.

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## Leader Notes

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**Vent**—the single body opening in birds, used to both discharge the waste products of digestion and the eggs or sperm from the reproductive tract.

**Wattles**—the fleshy, red growths that hang below the side and base of the chicken's beak.

**Wry Tail**—the tail of a fowl permanently carried to one side.

### **Domestic Waterfowl and Turkey Terms**

**Bean**—a raised, hard, bean-shaped swelling on the end of the bill of waterfowl.

**Beard**—a small cluster of coarse black hairs growing from the upper part of the breast of adult male turkeys.

**Bill**—the horny mouthparts of waterfowl.

**Caruncles**—the fleshy growths of naked portions of the head and neck of the turkey and Muscovy duck.

**Dewlap**—a growth of skin hanging from under the upper bill and throat of some breeds of geese (a dewlap-like skinfold in turkeys is usually called a wattle or throat wattle).

**Drake**—a male duck.

**Duck**—name for many smaller species of the waterfowl family; also female duck.

**Duckling**—a young duck.

**Fryer-Roaster**—a young turkey usually processed at 12 to 14 weeks.

**Gander**—a male goose.

**Goose**—name for many larger species of the waterfowl family; also female goose.

**Gosling**—a young goose.

**Knob**—a knob-shaped growth at the base of the upper bill in African and Chinese breeds of geese.

**Poult**—a young turkey.

**Sex Feathers**—the feathers in the tail of male duck (except Muscovy breed) which curl upward and forward.

**Snood**—a tube-like fleshy growth near the front of the top of the head in turkeys.

**Tom**—a male turkey.

**Web**—the skin growing between the toes of waterfowl.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Which method of learning terms in this lesson was most difficult? Why?
2. What method of learning do you enjoy most? Why?

#### **Process:**

3. Why is it important to use different learning methods?
4. Why do you think specific poultry terminology is important?

#### **Generalize:**

5. What did you learn about yourself as you tried different learning techniques?
6. What other activities do you do at school, home, etc., where specific terminology is needed?

#### **Apply:**

7. What are some hobbies or careers that might require an understanding of a lot of specific terms?

### **GOING FURTHER:**

- Attend a 4-H Poultry Quiz Bowl.
- Participate in a poultry judging contest and give oral reasons.
- Watch a poultry judge explain placings at a poultry show.
- Make a poster of poultry terms and share at next club meeting or your school class.

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## **REFERENCES:**

### **Author:**

Adapted from *Minnesota 4-H Animal Science Project Meeting Guide* by James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Poultry Breed Characteristics

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Physical traits and characteristics associated with 10 individual breeds or varieties of poultry
- Three to five breeds or varieties for each purpose (meat, egg or dual purpose production, plus exhibition)
- Origin of 10 different breeds and varieties of poultry

#### **ABOUT THEMSELVES:**

- Differences between people with different heritage and ethnic backgrounds

#### **Materials Needed:**

- Index cards with names of species, breeds, varieties and place of origin
- Pictures of various species, breeds and varieties
- Chalkboard or large piece of paper and marker to keep score
- *American Standard of Perfection* (use to get information on breeds, varieties, etc)

**ACTIVITY TIME NEEDED:** 30 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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During today's meeting, we are going to practice our skills in identifying species, breeds and varieties. We will see if we can select breeds according to their best purpose. We will also learn where some of the poultry species and breeds originated.

#### **CHICKENS**

The domesticated chicken was derived from the Wild Jungle Fowl, which still exists in a wild state in India and adjacent countries.

*The Standard of Perfection*, which is used to judge poultry at shows, classifies purebred chickens in the following categories.

**Class**—the class a chicken belongs in is determined by the geographical area of the world in which it was developed. There are 12 classes of chicken; most of the breeds and varieties raised in the United States belong to the American, English, Mediterranean, Asiatic or Continental classes.

**Breed**—a breed is a group of birds that possess common distinctive characteristics such as body shape. There are 60 breeds of chickens.

## Leader Notes

**Variety**—a variety is a subdivision of a breed that differs from another variety of the same breed by comb type (single, pea, rose), feather color (white, red, buff), or feather pattern (barred, spangled, laced). An example is the Leghorn breed, which contains 12 different varieties that differ by feather color or comb type. There are 175 varieties of chicken.

Poultry is also classified by the intended use of the birds. The major **types** are:

**Egg-type** are small-bodied chickens that have been selected for maximum egg production. The Single Comb White Leghorn is the main producer of white-shelled eggs in the United States, and the Rhode Island Red is the major producer of brown-shelled eggs.

**Meat-type** are large bodied, fast growing and heavily muscled chickens. The major breeds used in the production of meat-type chickens (broilers) are the White Plymouth Rock and the White Cornish.

**Dual-purpose** breeds of chickens have been bred for both egg and meat production. Examples are the Plymouth Rock, New Hampshire, Rhode Island Red and crosses between these breeds.

**Exhibition or Fancy type** are breeds and varieties developed for show. Many of these birds are bantams, which are one-fourth to one-third smaller in size than their normal counterparts.

**Strains.** As the industry has become more specialized, emphasis has shifted from development of new breeds and varieties to improvement of strains within breeds and varieties. A strain is a flock that has been closed to new bloodlines for several generations. Many strains are named after the original developer of the strain. Most commercial egg- and meat-type stocks are strain crosses.

Relay ID Game—you can have members take turns reading off clues, or you as leader can do this. If you have a large group, you may want to divide into several teams of two or three members. Give each player or team one point for each correct answer. Do not deduct points for incorrect answers. Some methods you may want to use in this game are: (a) read breeds and variety and have members tell whether they are for meat production, dual-purpose, egg production or exhibition; (b) read purposes of poultry and have members name breeds and varieties that fit into these categories or (c) name a species of poultry and have members match breed, variety names and place of origin.

### Characteristics of the More Common Breeds and Varieties of Chickens

Class	Skin Color	Earlobe Color	Egg shell Color	Main Use	Examples
American	Yellow	Red	Brown	Meat, egg	Plymouth Rock, New Hampshire, Rhode Island Red
English	Yellow/White*	Red	Brown	Meat, egg	Cornish, Australorp
Mediterranean	Yellow/White	White	White	Egg	Leghorn
Asiatic	Yellow	Red	Brown	Show	Brahma, Cochin
Continental	White	White	White	Show	Hamburg, Polish, Houdan, Sebright

\*The Cornish has yellow skin, while the Australorp has white skin.

**TURKEYS**

The turkey is a native of North America. Historical evidence indicates the Spanish explorers introduced the North American wild turkey into Europe. Several varieties developed from the stocks brought to the United States by the European immigrants. These stocks have provided the genetic base for present varieties.

**Characteristics of the More Common Breeds  
and Varieties of Turkeys**

<b>Variety</b>	<b>Primary Feather Color</b>	<b>Main Use</b>
Broad Breasted Bronze	Bronze and Black	Meat, show
Large White	White	Meat
Beltsville Small White	White	Meat
Bourbon Red	Red	Show
Narragansett	Black	Show

**DUCKS**

All breeds of ducks, except the Muscovy, most likely were derived from the Wild Mallard. The Muscovy is a native of South America and has a different genetic origin than the other breeds.

**Characteristics of the More Common Breeds of Ducks**

<b>Variety</b>	<b>Primary Feather Color</b>	<b>Main Use</b>
Pekin	White	Meat, show
Muscovy	White & Black varieties	Meat, show
Rouen	Multi-colored	Meat, show
Call	Various colors (varieties)	Show
Runner	Various colors	Eggs, show
Khaki Campbell	Light Brown	Eggs, show

**GEESE**

The common breeds of geese in the United States were imported from Europe and Asia. Most of the breeds originated from the wild gray goose.

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## Leader Notes

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### Characteristics of the More Common Breeds of Geese

Variety	Primary Feather Color	Main Use
Toulouse	Gray	Meat
Emden	White	Meat
African	Brown	Show
Chinese	White & brown varieties	Show, Weeders

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What species of poultry do you enjoy? Why?
2. What breed or variety are most common in each species?

#### Process:

3. What are the three main purposes for raising poultry?
4. Which purpose of poultry is most common in your area? Why?

#### Generalize:

5. Poultry classes are determined by geographic regions of the world. How does that compare to the different cultures represented by people who live in your community?
6. What are some neat aspects of various cultures?

#### Apply:

7. Why is it important to know about and understand other cultures?

### GOING FURTHER:

- Read about various species and breeds of poultry and trace their origin.
- Give a talk to your club or class about the origin and characteristics of your favorite breeds of poultry.

### REFERENCES:

- American Standard of Perfection*, American Poultry Association, Box 351, RD #4, Troy, New York, 12180
- The Bantam Standard*, American Bantam Association, Box 610, N. Amherst, Massachusetts, 01059
- Poultry Science Manual*, A.W. Adams, Department of Animal Sciences & Industry, Kansas State University, Manhattan, Kansas, 66506

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# Pigeon Breeds and Varieties

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Five breeds and varieties of pigeons
- To identify physical traits of pigeons

#### ABOUT THEMSELVES:

- Symbolic uses of pigeons or doves
- An understanding of figures of speech

### Materials Needed:

- Large sheet of paper and marking pens
- Pictures of pigeons or live pigeons
- Activity Sheet 13, Pigeon Parts
- Leader's key, Activity Sheet 13, Pigeon Parts
- Activity Sheet 14, Pigeon Breeds
- Leader's key, Activity Sheet 14, Pigeon Breeds

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

Pigeons are very versatile birds. They are used for the sport of racing as flyers and performers, for showing, for carrying messages and also for meat production. The term pigeon is used to name any bird in the pigeon and dove family. The larger birds are called pigeons, and the smaller birds are called doves.

Pigeons have a plump body, a small head, and short, sturdy legs. Pigeons are extremely powerful and fast flyers because they have large flight muscles in their chest. Their feathers are stiffer and smoother than those of most other birds. Pigeons vary in size. Most species will measure from about 10 to 15 inches long. The largest species is the crowned pigeon and it measures almost 3 feet long and weighs approximately 2 to 3 pounds. The smallest pigeon grows only about 6 inches long and weighs about 1 ounce.

Domestic pigeons are known to be the descendants of wild pigeons. The various domestic breeds and varieties we see today have evolved from the breeders' selection during breeding.

Pigeons have been a fascination since 5000 B.C. The Bible makes many references to pigeons and doves. In many cases, pigeons and doves symbolize love and peace. Pigeons may be found throughout the world

### Leader Notes

Ask members to list why people might raise pigeons. List their answers on the large sheet of paper.

Hand out Activity Sheet 13, Pigeon Parts, and ask members to identify body parts. Show pictures or examples of different breeds or varieties of pigeons and ask members to identify them. List key identifying characteristics for each breed or variety.

A resource that defines the parts of birds and other details is the Indiana 4-H Pigeon Resource Manual (4-H 742). Copies may be purchased from the Purdue Media Distribution Center, 301 South Second Street, Lafayette, Indiana 47905.

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## Leader Notes

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Hand out Activity Sheet 14, Pigeon Breeds, and have members match pictures of various breeds of pigeons. Use live pigeons if available.

and have gone through many physical changes through selective breeding practices. There are now more than 200 breeds.

Characteristics that help to distinguish between breeds include size, shape, behavior, stance, feather form, colors, markings and ornamentation. Most pigeons have dull-colored feathers that are black, blue, brown or gray. Most male and female feathers look alike, except the male feathers are a little larger and brighter in color.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What pigeon parts were hard to identify? Why?
2. What pigeon breeds are most common in your area? Why?

#### **Process:**

3. Why can pigeons fly faster than other domestic birds?
4. What are some characteristics that help distinguish between pigeon breeds? Which are most common?

#### **Generalize:**

5. What are some symbols pigeons or doves represent?
6. How have pigeons been used by people over time?

#### **Apply:**

7. What are some symbols represented by other birds or animals?
8. What are some common phrases or figures of speech that refer to pigeons or birds? (Be prepared to talk about the positive and negative affects of these sayings.)

### **GOING FURTHER:**

- Read a book about pigeons and share what you learned with your class or club.
- Visit a museum that has a display of pigeons and compare the differences and similarities between breeds.
- Visit a breeder of pigeons and discuss his or her breeding practices.

**REFERENCES:**

*The Pigeon*, Levi  
*Poultry Science*, Ensminger  
*Raising Pigeons*, MF 987, Kansas State University

**Author:**

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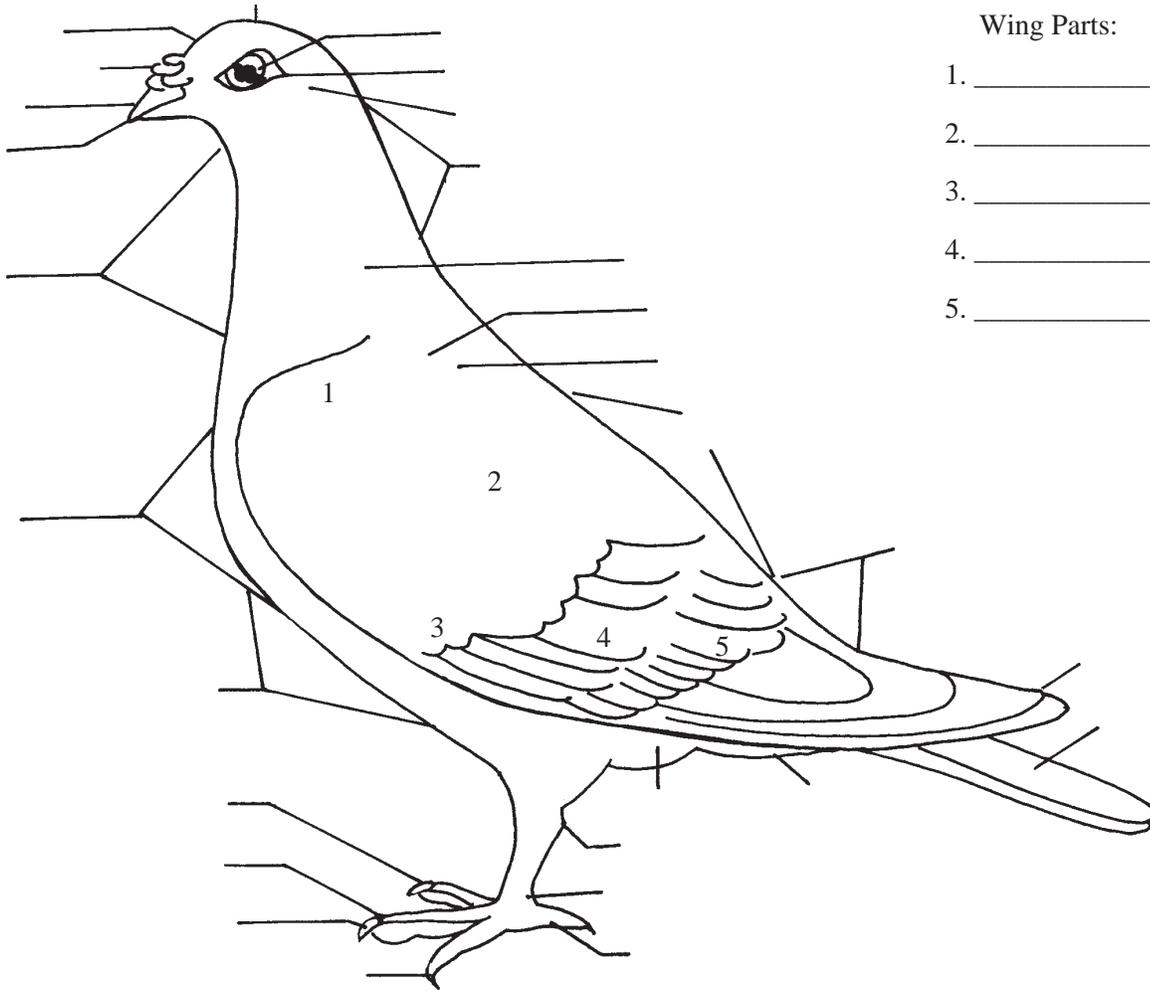
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**PIGEON BREEDS AND VARIETIES**  
**POULTRY, LEVEL II**  
**Activity Sheet 13, Pigeon Parts**

Write the correct word with the identified part.



Wing Parts:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

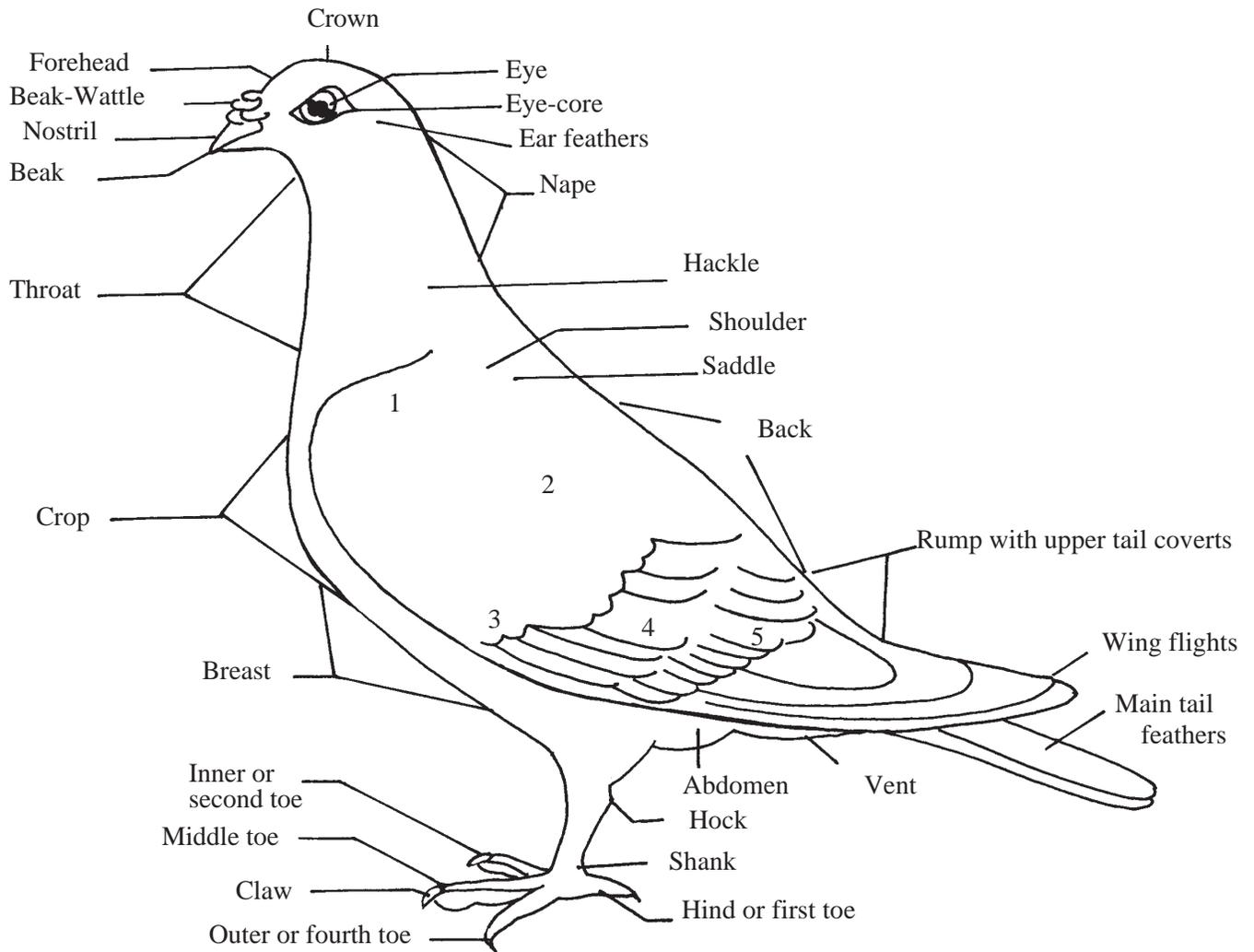
Forehead  
 Beak-Wattle  
 Ear feathers  
 Nape  
 Shoulder  
 Breast  
 Middle toe  
 Claw  
 Outer or fourth toe  
 Wrist or wing butt  
 Middle coverts

Crown  
 Eye-core  
 Beak  
 Crop  
 Saddle  
 Inner or second toe  
 Wing flights  
 Hock  
 Hind or first toe  
 Lesser coverts  
 First wing bar

Eye  
 Nostril  
 Throat  
 Hackle  
 Back  
 Rump with upper tail coverts  
 Abdomen  
 Vent  
 Shank  
 Second wing bar  
 Main tail feathers

**PIGEON BREEDS AND VARIETIES**  
**POULTRY, LEVEL II**  
**Leader's Key, Activity Sheet 13, Pigeon Parts**

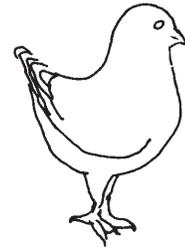
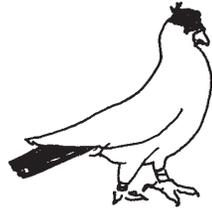
Write the correct word with the identified part.



- Wing
1. Wrist or wing butt
  2. Lesser coverts
  3. Middle coverts
  4. Second wing bar
  5. First wing bar

**PIGEON BREEDS AND VARIETIES**  
**POULTRY, LEVEL II**  
**Activity Sheet 14, Pigeon Breeds**

Match the name of the pigeon breed with the matching picture or diagram.



Racing Homer

Fantail

Roller

Helmet

Mondain

Jacobin

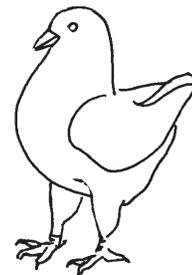
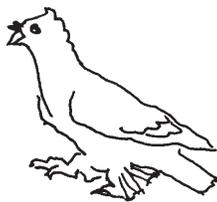
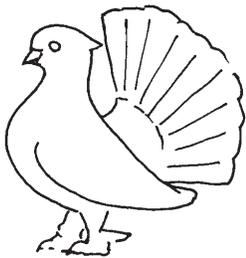
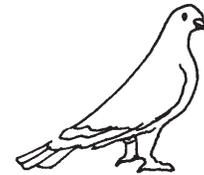
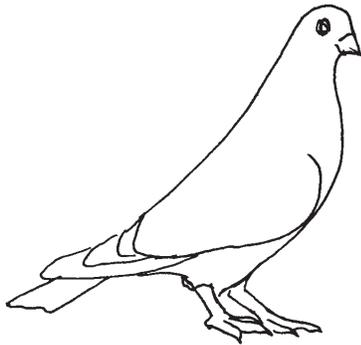
Indian Fantail

Modena

Trumpter

Swallow

King



**Think Back:**

What are some of the common characteristics of all breeds and varieties of poultry?

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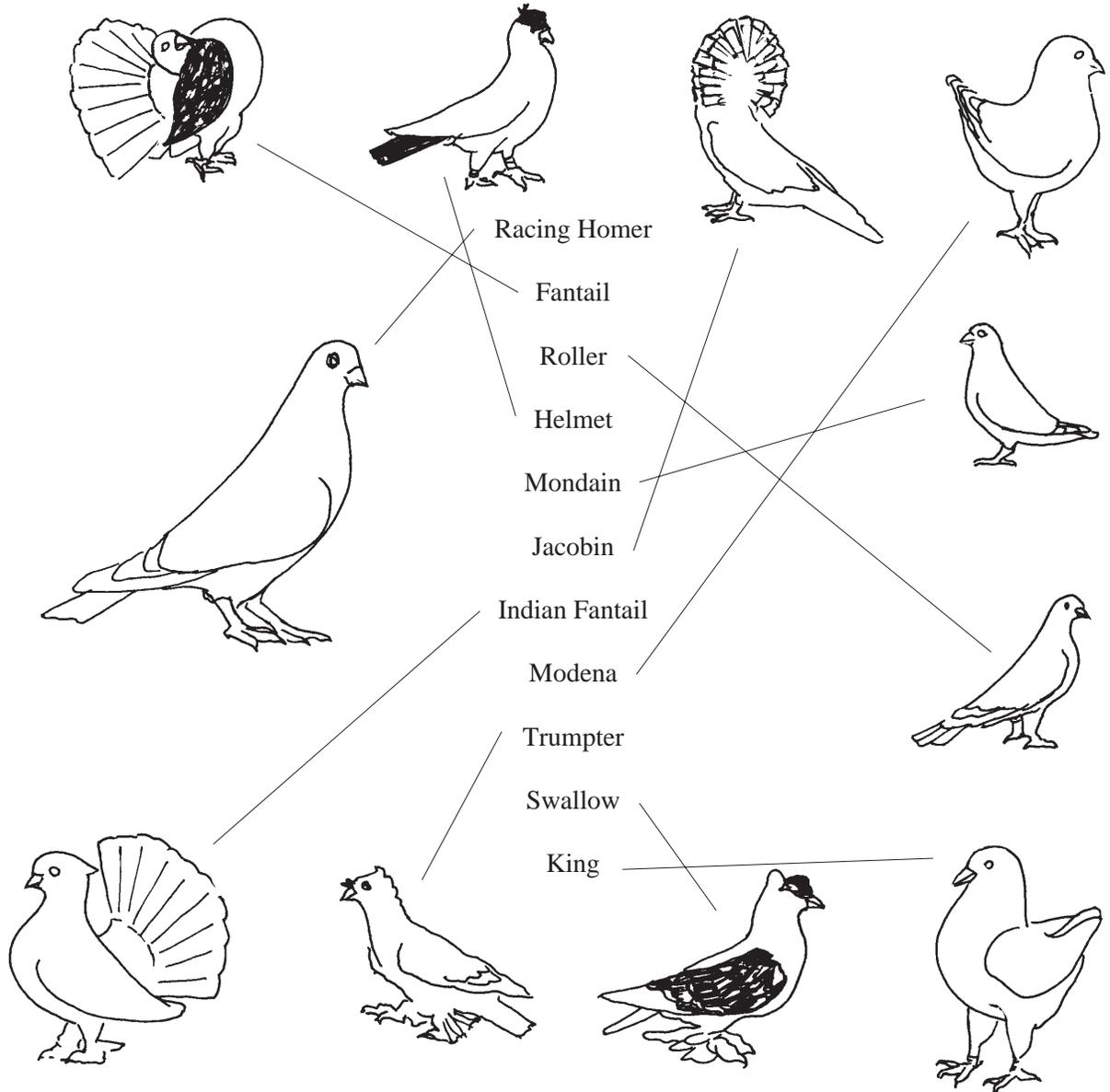
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**PIGEON BREEDS AND VARIETIES**  
**POULTRY, LEVEL II**  
**Leader's Key, Activity Sheet 14, Pigeon Breeds**

Match the name of the pigeon breed with the matching picture or diagram.







# Selecting Poultry for Show

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Standards for breeds of poultry according to their purpose
- Characteristics of birds to be evaluated by the judge using the American Standard of Perfection

#### ABOUT THEMSELVES:

- Personal strengths and weaknesses, and how they can improve

#### Materials Needed:

- *American Standard of Perfection*
- Live birds of various qualities or bird model
- Member Handout 13, Poultry Disqualifications and Defects
- Activity Sheet 15, Self Evaluation

#### ACTIVITY TIME NEEDED: 45 MINUTES

#### ACTIVITY:

As fair time approaches, you need to start looking at your birds and choosing the best ones to exhibit. What are some of the characteristics you would look for in a bird at the fair?

The judge has a guideline to look for in judging a live bird, just as your teachers have guidelines when grading your papers in school. The guideline judges use is called the *Standard of Perfection*. Inside this book is a list of all the recognized breeds and varieties of poultry and their specific characteristics.

The judge uses the *Standard of Perfection* to identify a breed of poultry. It tells him/or her what color the bird's feathers should be, how much it should weigh, what color its beak and legs should be, what type of comb it should have, plus some other descriptions.

When you select the bird you want to exhibit at a poultry show, you should look for a bird out of your flock that comes as close as possible to meeting the description listed. You also need to examine your bird for any defects or physical features that will disqualify it from receiving an award.

When you choose a bird for show, look at the shape and appearance of its beak, comb, color of feathers, size and shape of feathers, color of earlobes, weight, etc. A bird may be disqualified from the show or top award if it does not meet the guidelines listed in the *Standard of Perfection*.

#### Leader Notes

Ask members to list several characteristics they would look for in a bird. If you have a live bird, have members point to the characteristic they are describing.

Show members the *Standard of Perfection*. Select several breeds or varieties and tell what information is listed for each breed.

Have members identify what breed of bird they prefer. Talk about the description given in the *Standard of Perfection* for that breed.

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## Leader Notes

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Hand out Member Handout 13, Poultry Disqualifications and Defects. Review the sheet with the members.

It's a good idea to select the birds you plan to exhibit at least two weeks before the show, so you have enough time to examine the birds for disqualifications or defects. You also need to pay attention to the bird's health. You don't want to exhibit a sick bird.

Look over your flock when it is gathered in the poultry house or yard and make a preliminary selection of several birds. Choose about three times as many birds as you intend to enter. Observe them carefully for two or three days before making your final choice.

### **CLASSES OF POULTRY**

Most shows such as county and state fairs will have two broad divisions: production and exhibition.

#### **Production**

Enter birds in this classification if their primary purpose is for egg or meat production. Egg-type and dual-purpose birds should be exhibited only as trios of pullets or hens. Meat-type (broilers, roasters, capons) birds should be exhibited as trios of either sex. Judging is on their production qualities only.

For egg production classes, select birds that are as uniform as possible and matched with respect to size, head type, plumage color, shank color, state of maturity, etc. Select birds of good production type; normal size; well-feathered; free of serious physical defects (crooked beaks, deformed legs, crooked keels); and vigorous, healthy and alert.

When you select pullets, choose those birds that show characteristic femininity, refinement and sexual maturity as indicated by enlargement and redness of the comb and wattles. Pullets should be free of signs of old age. The ideal pullets to be exhibited should be near or in the early stages of egg production.

Select hens that show superior present and past egg-production as indicated by the condition of their comb, wattles, eyes, pubic bones, abdomen and vent. Also consider degree of bleaching and status of molt. If you are going to exhibit meat production birds, select birds that are as uniform as possible in size, body conformation, fleshing and finish (fat covering). Select birds that are well-feathered and free from defects, such as breast blisters and callouses, curved and crooked breast bones, bruises, cuts and tears, and hunched backs. Fleshing and finish develop with age, so older birds will have more desirable meat qualities than younger birds.

#### **Exhibition**

Standard bred (normal size) and bantam breeds of chickens, ducks and turkeys should be entered in the young and old classes of exhibition poultry. Chickens are classified by age as follows: cock and hen—birds hatched prior to the current calendar year; or cockerel and pullet—birds hatched during the current calendar year. These birds should be purebreds that have been selected for exhibition qualities. Exhibition birds are usually exhibited as a single male or female.

Exhibition birds should have the best body type for the breed, be uniform in color, have well-developed bodies and well-developed but not worn or ragged feathers, be healthy and free from physical defects, have the correct breed characteristics and be free from disqualifications.

A **disqualification** is a physical defect that prevents a bird from being considered for an award. Some common general disqualifications are:

1. Crooked or crossed beak; crooked breast bone, legs or seriously crooked toes; roached or deformed back.
2. Side sprigs (extra points) on comb, split (divided) comb; comb foreign to the breed.
3. Unacceptable coloring of the earlobe, face, shanks, or feathering according to breed standards.
4. Stubs (small feathers) on legs or between toes of other than Asiatic breeds.
5. Wry tail (off to one side) and a split wing.

Hand out member Activity Sheet 15, Self Evaluation. After completion, have them discuss with a partner or a group.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What traits are most important when selecting the best bird of your preferred breed? Why?
2. What are the most difficult traits to identify? Why?

#### **Process:**

3. What are the differences between production and exhibition classes?
4. What are some general disqualifications?

#### **Generalize:**

5. What do you use as your standard for measuring who is a good friend?

#### **Apply:**

6. How important is your first impression when meeting new people?
7. How will you use your personal strengths and weaknesses to improve your personality or character in the future?

### **GOING FURTHER:**

- Attend a poultry show, watch and listen to a judge.
- Participate in a poultry judging school or contest.

**REFERENCES:**

*A Guide in Selecting and Preparing Poultry for Show*, L-171, Kansas State University

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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## SELECTING POULTRY FOR SHOW

### POULTRY, LEVEL II

#### Member Handout 13, Poultry Disqualifications and Defects

##### Common Defects and Disqualifications

A **defect** is anything short of perfection. The cut for a defect should depend on its severity and how it compares to the severity of a defect or deformity that bars a bird from an award. This is called a **disqualification**. Following is a list of the major disqualifications by categories. Consult the Standard for a more detailed list and description.

##### Shape

Back: crooked, roached, or deformed.

Beak: deformed in chickens and turkeys.

Beard

and muffs: absence of beard and muffs in bearded varieties, and presence of a beard in non-bearded varieties.

Bill: scooped or deformed in ducks and geese.

Body: crooked keel or breast bone in all breeds of turkeys and Cornish chickens.

Comb: one foreign to the breed or variety; a rose comb so large or lopped it obstructs the sight; absence of spike or more than one on a rose comb; a pea comb lopped below the horizontal where the bend occurs, except where this condition is a breed characteristic; a split comb with a side sprig; a cushion comb with a spike or spikes.

Crest: absence of crest or lopped crest.

Neck: pendulous crop in turkeys.

Plumage: hen feathering in males of all breeds except Sebright.

Shanks

and toes: **all breeds**—bow legs; deformed foot or foot joint; duck foot in land fowl; enlarged and misshapen shank or hock; knock knee; web foot in land fowl; more or less than correct number of toes; absence of spurs in Old English and Sumatra cocks; presence or evidence of any down, stub, feather, or part of feather from shank below the hock joint, or foot or toe, on clean-legged breeds; shanks not feathered down outer sides of feather-legged breeds.

Tail: **all breeds**—complete absence of tail feathers (except Araucanas); one or more reserve tail feathers; split tail in cock and hen; squirrel (except Japanese bantams), and wry tail.

Wings: **all breeds**—twisted primary or secondary feather (except in Sebastapol geese and Frizzle chickens); split wings; slipped wing; one or more reversed main wing feathers; and one or more primary or secondary feathers with a split quill; clipped primary or secondary feathers in all breeds of chickens and turkeys, and all breeds of waterfowl except Canada and Egyptian geese, and Muscovy, East India, Call and Mallard ducks; inverted wingtips in all breeds of ducks and geese.

##### Color

Bill: black in bill or bean of white-colored drakes; more than 10 percent black in bill or bean of ducks.

Earlobes: white in red-earlobed breeds.

Face: white in red-earlobed breeds.

Plumage: red or yellow in all barred, black and mottled varieties; black in quills and primaries and secondaries and foreign color (except slight gray ticking) in all white varieties.

Shanks

and toes: color foreign to the breed, except slight reddish in tinge of pigment in yellow shanks.

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**SELECTING POULTRY FOR SHOW**  
**POULTRY, LEVEL II**  
**Activity Sheet 15, Self Evaluation**

List your personal strengths and weaknesses and how you feel you can improve

Strengths:

How to improve:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Weaknesses:

How to improve:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



# Poultry Grooming

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Three grooming techniques used by chickens
- The purpose of each grooming technique

#### **ABOUT THEMSELVES:**

- What they do to maintain personal body hygiene
- Grooming practices they do for social reasons
- Why their personal appearance is important to them

#### **Materials Needed:**

- Small Farm Flock
- Pencil and writing pad
- Activity Sheet 16, Observing Poultry Grooming Habits

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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Animals groom themselves, as we do, except in different ways. The object of their grooming is much the same as ours, to clean themselves and make them attractive to others of their species.

There are three basic types of grooming by birds. **Dust bathing** is practiced by birds that are allowed on the ground. It involves the birds resting on an area where the soil is dusty. By fluffing their feathers, dust particles are spread over their body surfaces. This process has a soothing effect and, in some cases, is useful in controlling external parasites such as lice. **Preening** involves the bird using its beak or bill to spread oil secreted by the oil gland (located on top of the tail) onto the feathers. The oil maintains the luster of the feathers and improves the water resistance of the feathers. **Feather pecking** can be either a grooming activity or a cannibalistic activity. Feather pecking is a grooming activity when a bird pecks or grooms the feathers of penmates. In contrast, feather pecking becomes a cannibalistic activity when damage is done to the skin or feathers of the bird that is being pecked.

Observe a group of birds in an area where they can be viewed and not disturbed. This could be a loafing pen or run attached to a building. Sit and watch the birds. What activities are observed? Make a list on the activity sheet of each grooming activity and what its function/reason might be.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What types of grooming did you observe in the flock?
2. What types of grooming occurred most often? Why?

#### **Process:**

3. When birds picked at the top of their tail, what were they doing? Why?
4. Why do birds groom themselves?

#### **Generalize:**

5. Why are good grooming habits important to you? (Consider health and appearance.)
6. How do you decide what style of grooming to use?

#### **Apply:**

7. When does grooming for health reasons conflict or agree with social appearance? Why?
8. How do you think your grooming habits will change as you get older? Why?

### **GOING FURTHER:**

- Read a book on poultry behavior.
- View a video or movie on some aspect of poultry behavior.

#### **Author:**

John Struwe, Extension Assistant, University of Nebraska–Lincoln; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

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# Poultry Showmanship

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT**

- Five parts of a bird examined during showmanship
- Characteristics defining quality and condition of a bird
- How to take waterfowl from a cage

#### **ABOUT THEMSELVES:**

- How they feel about presenting themselves for examinations
- How they feel about the impressions they make with friends and others

#### **Materials Needed:**

- Tables and cages
- Live bird
- Wood shavings
- Paper to cover table
- A judge
- Member Handout 14, Poultry Handling Positions
- Member Handout 15, Scorecard for Poultry Showmanship

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

Most showmanship events involve demonstrating these procedures when requested by the judge.

#### **HOLDING AND CARRYING THE BIRD**

To carry a bird, you should keep the body balanced and upright on the palm of the same hand which was used to remove the bird from the cage. The head and neck may extend between the arm and body of the person carrying it or, with a small bird, against the carrier's body and above the arm on which it is carried. The other hand should rest on the bird's back.

#### **EXAMINATION AND HANDLING**

Birds should be held upright to give the judge a side view of the body. The bird should rest comfortably on the palm of the holder's hand. The strengths of the bird should be emphasized: tails fluffed, head and beak raised, feathers smoothed, wings tucked in normal position. In this basic hand-posed position, the participants will be asked to show the judge several parts of the bird.

#### **Leader Notes**

Set up a practice contest with a member as the judge and a team of two members to show a bird. After the members have attempted to perform each task, ask each pair to demonstrate one of the tasks for the entire group.

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## Leader Notes

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**Head**—The bird should be raised to shoulder height and turned so the head and face can be examined. The hand supporting the bird should remain in place, while the free hand moves the head. Complete the examination by turning the bird to examine the other side of the head and face.

**Wings**—Spread wings to examine condition and pattern of the feathers. To extend the first wing, grasp wing tip with free hand and pull. To examine second wing, place free hand across body of bird and apply pressure to last wing joint with thumb and fingers of free hand to extend the wing.

**Undercolor**—The undercolor of the back and body fluff of the birds will be examined. Use finger tips to gently pull tops of feathers against the grain. This action exposes portions of feathers normally hidden from view.

**Width of Body**—Width of body is determined by placing the thumb and index fingers of free hand across the bird's body directly behind the bases of the wings. Gently push the measuring arch, thus formed downward to the tail, to determine the width and shape of the body.

**Breast**—Without changing the grip, examine the breast by holding the bird so its head is downward and its back is directly against the body of the showman. The showman's free hand should be used to measure the breast bone and examine the keel for straightness, breast blisters, indentations or other defects. In this position the depth of the body or distance between the keel and back may also be determined.

**Depth of Abdomen**—After examining the vent, measure the depth of the abdomen by placing as many fingers of the free hand as possible between the tip of the keel and the pubic bones.

**Pubic Bones**—The width between the pubic bones is determined by placing as many fingers of the free hand as possible between the tips of these bones.

**Feet and Legs**—To examine the feet and legs, the bird is held against the showman's body. The free hand should be used to manipulate feet and legs so all parts can be examined. Swivel the bird to examine the front of the feet and legs.

### **PERSONAL APPEARANCE OF MEMBERS**

Each contestant should be neatly dressed in clean, well-pressed clothes. No uniform is required, but no shorts or cut-offs should be worn. Personal grooming is particularly important.

### **QUALITY AND CONDITION OF THE BIRD**

When selecting a bird, whether it's a male or large female bird, a bantam, a duck, a goose or a turkey, the following characteristics should be considered:

- Pleasing appearance—bright eyes, good fleshing, free from defects
- Good, smooth plumage—shiny appearance, clean and washed if appropriate for species
- Breed and varietal characteristics
- Free from diseases and parasites
- Gentle and not flighty—usually a bird that is worked with over a period of time will become accustomed to the showmanship routine and will show its strongest characteristics while being judged. A radio played near the bird will also help familiarize it with show conditions. A short practice session just before the contest is also suggested to help calm both bird and exhibitor.

### **KNOWLEDGE OF POULTRY TERMS**

The judge will ask the participants to explain various poultry terms and their relationship to the bird and the poultry project.

### **TURKEY AND WATERFOWL SHOWMANSHIP HINTS**

Turkey and waterfowl are shown similar to chickens. The only major difference occurs when waterfowl are taken out of the cage. The correct procedure is as follows:

Open cage door. Grasp large duck's or goose's neck (loosely) and turn bird toward cage door. Pull out of cage, head first. At the same time, slide second hand beneath the bird's body, placing fingers between the bird's legs and grasping them so the bird, when lifted, can be balanced on the palm of that hand. Place first hand on bird's back and wings.

All other procedures will be the same as for chickens. When taking out very small ducks, such as bantam ducks, the same procedure as for chickens may be used. Ducks and geese should never be caught by the legs.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What happened the first time you attempted to properly hold and carry a bird?
2. What examination position was the most difficult? Why?

#### **Process:**

3. What are some of the parts of a bird to examine during showmanship? Why do you think these parts were selected?
4. What differences in handling are there for turkeys and waterfowl? Why?

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## Leader Notes

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### Generalize:

5. How important is your personal appearance when showing poultry? Why?
6. When have you had to present yourself for inspection or examination? Why?

### Apply:

7. What do you do to present your best qualities to others?
8. How important do you think a good impression will be when interviewing for a job in the future? Why?

### REFERENCES:

*Preparing for 4-H Poultry Showmanship*, Agricultural Extension Service, University of Minnesota  
*The Standard of Perfection*, American Poultry Association, 26363 S Tucker Road, Estacada, Oregon 97023  
*Judging Poultry at the County Fair*, L-772, Kansas State University  
*A Guide in Selecting and Preparing Poultry for Show*, L-771, Kansas State University

### Author:

Adapted from *Preparing for 4-H Poultry Showmanship*, Agricultural Extension Service, University of Minnesota by Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# POULTRY SHOWMANSHIP

## POULTRY, LEVEL II

### Member Handout 14, Poultry Handling Positions



Carrying

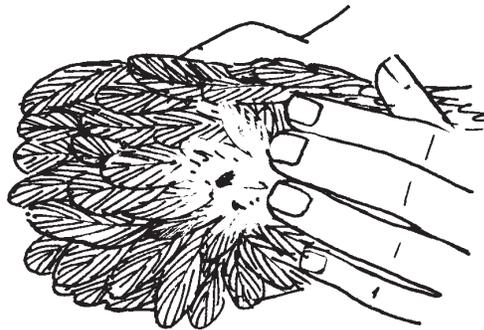
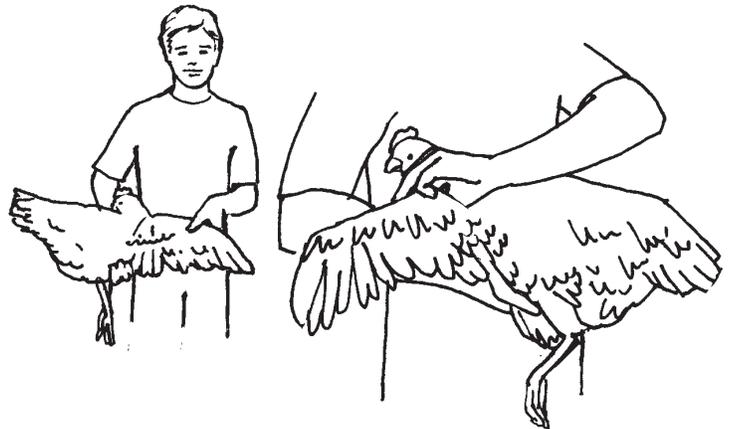
Holding



Wing Examination



Head Examination



Under Color

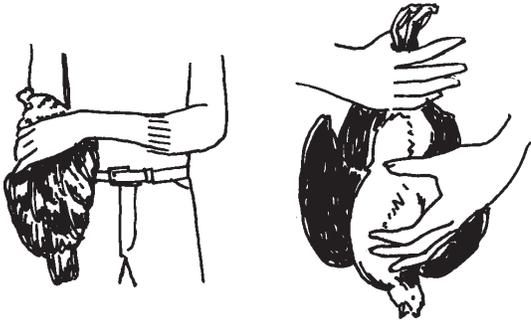
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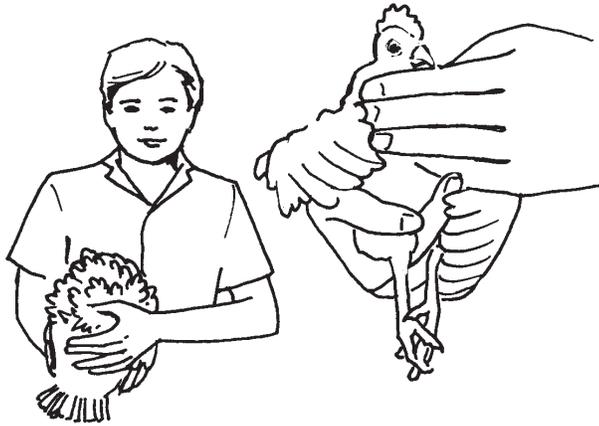
# POULTRY SHOWMANSHIP

## POULTRY, LEVEL II

### Member Handout 14, Poultry Handling Positions, *continued*



Width of Body and Breast



Depth of Abdomen



Feet and Legs



Pubic Bones

**Think Back:**

Why is doing and looking your best important? List times when it is extremely significant.

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## POULTRY SHOWMANSHIP

### POULTRY, LEVEL II

#### Member Handout 15, Scorecard for Poultry Showmanship

Exhibitor Number: \_\_\_\_\_

*Possible  
Points*      *Points  
Awarded*

10		1. Introduction
20		2. Grooming and condition of bird
		3. Routine in any order should be smooth
5		A. Examination of head, wattle, etc.
5		B. Wings, color pattern, condition of feathers, check for lice or mite damage.
5		C. Show width of back, undercolor.
5		D. Check keel bone, breast, feather color, undercolor.
5		E. Feet, toes, shank.
5		F. Tail, proper carriage, condition
5		G. Place bird on table and pose for judge.
20		4. Exhibitors apperance and attitude
15		5. Exhibitor's speaking ability and knowledge of the subject.
<b>100</b>		<b>Total</b>





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# Basic Egg Cookery

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The nutritional value of eggs
- The functional properties eggs contribute in food preparation
- Various methods of cooking eggs
- Proper egg handling and care

#### **ABOUT THEMSELVES:**

- How important they believe eggs are in their diet
- How they feel about the functional properties of eggs
- To what extent they think they will use eggs in the future

#### **Materials Needed:**

- Eggs
- Ingredients and cooking equipment are required for the recipe(s) that will be used
- Member Handout 16, Nutrient Density of the Egg
- “Kids in the Kitchen” and “Basic Egg Cookery” from the Kansas Poultry Association
- Activity Sheet 17, Egg Dish and Properties Word Match
- Leader’s Key, Activity Sheet 17, Egg Dish and Properties Word Match

**ACTIVITY TIME REQUIRED:** 60 MINUTES

#### **ACTIVITY:**

Eggs are hard to beat for easy preparation, great versatility and delicious eating. Eggs are also one of nature’s most nourishing foods, since they contain a wide array of necessary nutrients that both chicks and humans need.

Egg protein is of such high quality that it is often used as the standard by which other protein is measured. Egg protein contains all of the essential amino acids (building blocks of protein that the body needs but cannot make) in a pattern that closely matches the pattern the body needs. That is why eggs are classified with meat in the basic food groups and why egg protein is called a complete protein.

Foods that supply significant amounts of one or more nutrients compared to the number of calories they supply are called nutrient dense. Eggs have a high nutrient density because they provide excellent protein and a wide range of vitamins and minerals in proportion to their calorie count. For example, one large egg provides 15 percent of the U.S. Recommended

#### **Leader Notes**

Ask members to name the four main food groups and indicate which group eggs belong in.

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## Leader Notes

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Hand out Member Handout 16, Nutrient Density of the Egg.

Let members try to identify these functional properties or uses.

Give each member the Activity Sheet 17, Egg Dish and Properties Word Match, as a review.

Using either the leaflets Kids in the Kitchen or Basic Egg Cookery, have groups of members prepare eggs by different methods of cooking. Identify functional property with each method of cooking.

Daily Allowance for protein; equals 1 ounce of lean meat, fish or poultry; contains varying amounts of vitamins (but no vitamin C) and minerals; and contains only 80 calories. An egg yolk is one of the few foods which contain vitamin D, the sunshine vitamin.

In addition to their nutritional qualities, eggs are used in cooking because of their varied functional properties. Examples of an egg's functional properties are:

1. **Foaming or leavening**—air bubbles are trapped in liquid egg white when it is beaten. The beaten white becomes foamy, increases six to eight times in volume, and stands in peaks. When the foam is heated, the tiny air cells expand and the egg protein coagulates around them, giving permanence to the foam. Egg white foam is responsible for the structure of souffles, angel food cakes, puffy omelets, and meringue. Fat inhibits the foaming of egg white, so be sure beaters and bowls are clean and there is not a trace of yolk in the whites.
2. **Thickening**—when eggs are added to pumpkin pies, custards and sauces, heating coagulates the protein, causing the mixture to become thicker.
3. **Coating**—eggs are added to batters that meat, French toast, and vegetables are dipped in prior to deep-fat frying. The egg increases the ability of the batter to stick to the food.
4. **Emulsification**—a component in an egg, called lecithin, helps to stabilize emulsions or mixtures of liquids, such as mayonnaise, salad dressings, and Hollandaise sauce, so the various ingredients do not separate.
5. **Garnishing**—eggs can be hard cooked and used as a garnish on salads.

There are **five basic methods for cooking eggs**: **baked** (also known as shirred); **cooked in the shell** (eggs in their shells cooked in water) either hard-cooked or soft-cooked; **fried**; **poached** (eggs cooked out of the shell in hot water, milk, broth or liquid); and **scrambled**.

The basic principle of egg cooking is to use a medium to low temperature and time carefully. When eggs are cooked at too high a temperature, whites shrink and become tough and rubbery; yolks become tough, and their surface may turn gray-green. Eggs other than hard-cooked should be cooked until the whites are completely coagulated and the yolks start to thicken.

Before you start to cook:

- Wash your hands!
- Wear an apron if you have one.
- Read the recipe and get the food and utensils you will need.
- Be sure to use only microwave-safe dishes when you cook in the microwave.
- When you uncover a hot pan or dish, lift the back edge of the lid or plastic wrap first.
- Use pot holders to move hot pans or dishes.
- Don't forget to clean up!

The same nutrient qualities that make eggs a high-quality food for humans can also be a good growth medium for bacteria that cause food poisoning. In addition to food, bacteria also need moisture, a favorable temperature (between 40° and 140°F), and time to multiply to large enough numbers to cause illness. By using good hygiene, refrigeration, cooking and handling practices, you can ensure that your eggs will maintain their high quality and safety for use in dozens of ways.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How often do you eat eggs? Why?
2. What egg cooking method do you use most/least? Why?

#### **Process:**

3. Why is an egg nutrient dense?
4. What is significant about the functional properties of eggs?

#### **Generalize:**

5. What is your favorite use of eggs? Why?
6. How important are eggs in your diet? Why?

#### **Apply:**

7. How important is food safety when using eggs compared to other foods?
8. How will ease of cooking affect your use of eggs in the future?

### **GOING FURTHER:**

- Discuss the issue of fats and cholesterol as it relates to eggs.
- Prepare a talk or demonstration about eggs to share with classmates or other audiences.
- Visit a restaurant to see how eggs are used or to determine the most popular uses.

### **REFERENCES:**

*Kids in the Kitchen*, *Basic Egg Cooking*, *Answers to Often-Asked Questions About Eggs*, and *Eggcyclopedia*, American Egg Board leaflets, 1460 Renaissance Drive, Park Ridge, Illinois, 60068, or the Kansas Poultry Association, 225 Call Hall, Manhattan, KS 66506-0202

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### **Reviewed by:**

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## **BASIC EGG COOKERY**

### **POULTRY, LEVEL II**

#### **Member Handout 16, Nutrient Density of the Egg**

Percentage of U.S. Recommended Daily Allowances (US RDA)  
provided by 1 large egg

PROTEIN .....	15%
VITAMIN A .....	6%
VITAMIN C .....	LESS THAN 2%
THIAMINE .....	2%
RIBOFLAVIN .....	15%
NIACIN .....	LESS THAN 2%
CALCIUM.....	2%
IRON .....	4%
VITAMIN D.....	6%
VITAMIN E .....	2%
VITAMIN B6 .....	4%
FOLIC ACID.....	6%
VITAMIN B12 .....	8%
PHOSPHORUS .....	8%
IODINE .....	15%
MAGNESIUM .....	LESS THAN 2%
ZINC.....	4%
COPPER .....	LESS THAN 3%
BIOTIN .....	4%
PANTOTHENIC ACID .....	6%

80 CALORIES (4% OF DAILY INTAKE ON AN 1800 CALORIE DIET)

5 GRAMS OF FAT (1 GRAM POLYUNSATURATED, 2 SATURATED, 2 MONOUNSATURATED)

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## **BASIC EGG COOKERY**

### **POULTRY, LEVEL II**

#### **Activity Sheet 17, Egg Dish and Properties Word Match**

Match the functional properties of eggs with the correct egg dish. Match all that apply.

#### **Functional Property**

Emulsification

Foaming

Thickening

Garnish

Coating

#### **Egg Dish**

Meringue

Angel food cake

Pumpkin pie

Custard

Souffle

Meat batter

Mayonnaise

Salads

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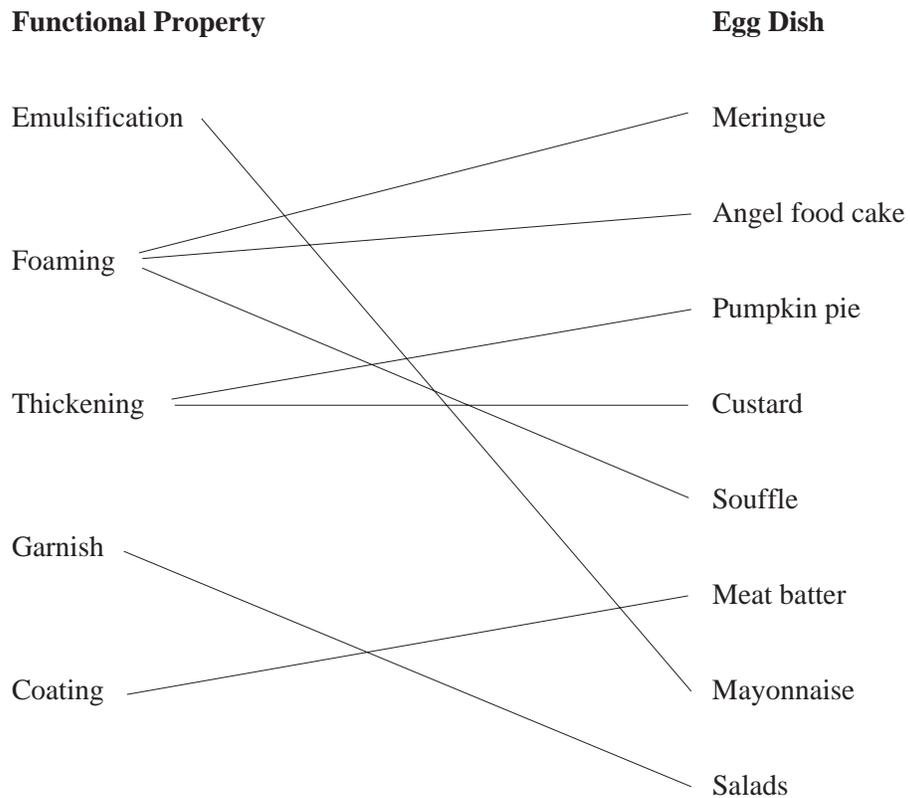
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## BASIC EGG COOKERY

### POULTRY, LEVEL II

#### Leader's Key, Activity Sheet 17, Egg Dish and Properties Word Match

Match the functional properties of eggs with the correct egg dish. Match all that apply.







# Ethnic Recipes for Omelets

## *Poultry, Level II*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- How to read and follow a recipe
- To observe and demonstrate how to make a two-egg omelet
- To learn about the nutritional value of an egg
- To compare the differences between high- and low-quality omelets and scrambled eggs

#### **ABOUT THEMSELVES:**

- Their feelings about other cultures and ethnic groups related to omelet fillings

#### **Materials Needed:**

- Eggs
- Cooking utensils required for preparing omelets
- Recipes for various types of omelets
- A good appetite
- Member Handout 17, Omelets

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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Whether you prefer the French spelling “omelett” or the all-American “omelet,” an omelet is easy to make. It is beaten eggs cooked in a pan, then rolled or folded—usually around a filling, and, sometimes, with a topping. Since the filling can be almost anything you like, an omelet is one of the most versatile dishes in a cook’s recipe collection.

The ancient Romans supposedly made the first omelet, and, because it was sweetened with honey, called it *omemele* (egg and honey). Some insist this was the origin of the word *omelet*. Others maintain the word was derived from *omelett* (French) meaning blade, describing the long, flat shape of an omelet.

Whatever its origin, an omelet can hold or be topped with any food from caviar to leftover meatloaf, vegetables, etc. The possibilities of fillings and toppings are only limited by your imagination and the contents of your refrigerator. In fact, the main difference between omelets in different cultures is the fillings that are used.

An omelet can be a down-home main dish served on everyday stoneware, or it can be filled with fancy foods from the gourmet section and served on china. For any meal of the day, an omelet is easy to adapt to suit your

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## Leader Notes

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taste, time table and budget. The three basic omelets are the French omelet (plain), the basic French (plain) microwave omelet, and the basic puffy (souffle) omelet.

Omelets are easy and quick to prepare and are very economical. A plain omelet takes only about one to two minutes to prepare on top of the range. Or, if you like, use the microwave for the added convenience of no-stir cooking. If a dozen large eggs costs 90 cents a dozen or 60 cents a pound, the egg in a two-egg omelet costs 15 cents.

Have members break into groups of two or three and select and prepare an omelet.

Give members Member Handout 17, Omelets, illustrating the steps in making an omelet.

Using the table showing the nutritional content of eggs, have members calculate the grams of protein and calories a two-egg omelet contains.

### **Making an Omelet is Easy—Follow These Simple Steps**

- Cooking an omelet requires very little equipment: an 8- to 10-inch diameter no-stick pan, a mixing bowl, an egg whip, a plastic spatula, and a serving dish.
- Prepare the fillings before starting to cook the eggs. Heat refrigerator-cold ingredients to serving temperature or fully cook raw foods before you begin cooking the omelet.
- Use 1 tablespoon of water for each egg. Water is recommended for omelets because the high heat used in cooking omelets will break down the protein in milk resulting in a flat texture rather than the desired fluffiness. Use water for omelets, milk for scrambled eggs. Beat eggs, water, salt and pepper until blended.
- Heat the omelet pan over medium-high heat until pan is hot enough to sizzle a drop of water. Add a pat of butter or teaspoon of vegetable oil to the pan. Pour in egg mixture.
- With an inverted spatula or pancake turner, carefully push cooked portions at edges toward center of pan so uncooked portions can reach hot surface at edge of pan. Tilt pan and move cooked portions as necessary.
- While the top is still moist and creamy-looking, but not runny, fill the omelet (on left side if right-handed, vice versa if left-handed).
- After filling omelet, fold in half or roll with spatula. Invert (flip over) omelet onto plate with a quick flip of the wrist or slide from pan onto plate. Flipping omelet over hides those tears that may occur when you fold the omelet over.

**Proper care and handling of eggs** and egg dishes is very important to prevent food infections. Follow these steps to assure proper care and handling:

1. Hold eggs or egg dishes at below 45°F or above 140°F.
2. Wash hands before preparing omelets.
3. Use only clean, uncracked eggs.
4. Use clean, sanitized utensils and equipment.
5. Cook omelet thoroughly.
6. Never leave egg dishes at room temperature for more than 1 hour.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What did you like about making an omelet? Why?
2. What was the most difficult part of making an omelet?

#### **Process:**

3. What are the differences between omelets and scrambled eggs?
4. What is significant about omelet fillings?

#### **Generalize:**

5. What cultures or ethnic groups could you study because of omelet fillings?

#### **Apply:**

6. How will you act differently in the future as a result of learning to make omelets?
7. What will you do differently the next time you make omelets?

### **GOING FURTHER:**

- Demonstrate how to make an omelet before your club.
- Prepare different types of omelets using different fillings.
- Prepare a flaming dessert omelet.
- Organize and hold an omelet party for a special event of your club or as a fund raising project. Equipment for such an event is available from the Kansas Poultry Association, 1816 Alabama, Manhattan, Kansas 66502, (785) 539-5441.

### **REFERENCES:**

*Omelets*, and *Basic Egg Cooking*, Kansas Poultry Association, 1816 Alabama, Manhattan, Kansas 66502, or American Egg Board, 1460 Renaissance, Park Ridge, Illinois, 60068  
*Flaming Dessert Omelet*, Kansas Poultry Association, 255 Call Hal, Manhattan, Kansas 66506-0202

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## Leader Notes

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**ETHNIC RECIPES FOR OMELETS**  
**POULTRY, LEVEL II**  
**Member Handout 17, Omelets**

**NUTRITION INFORMATION PER SERVING**  
 1 Large Egg (50g edible portion)

Calories .....	80
Protein .....	6 g
Carbohydrates less than .....	1 g
Fat (Percent of Calories - 56%) .....	5 g
Polyunsaturated .....	1 g
Saturated .....	2 g
Monounsaturated .....	2 g
Cholesterol .....	215 mg
Sodium .....	65 mg

Making an omelet is easy!



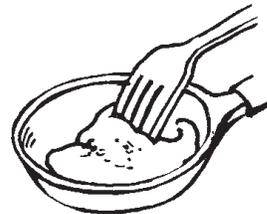
Beat



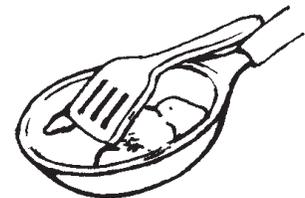
Pour

**Percentage of U.S. Recommended Daily Allowances (U.S. RDA)**

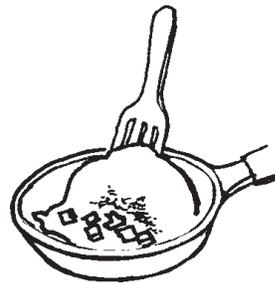
Protein .....	15	Vitamin B6 .....	4
Vitamin A .....	6	Folic Acid .....	6
Vitamin C .....	*	Vitamin B12 .....	8
Thiamine .....	2	Phosphorus .....	8
Riboflavin .....	15	Iodine .....	15
Niacin .....	*	Magnesium .....	*
Calcium .....	2	Zinc .....	4
Iron .....	4	Copper .....	*
Vitamin D .....	6	Biotin .....	4
Vitamin E .....	2	Pantothenic Acid ...	6



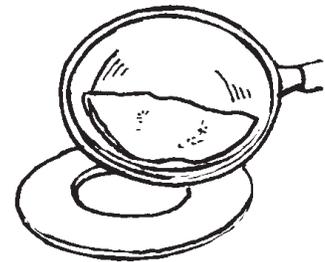
Push



Tilt



Fill



Serve

\*Contains less than 2% of the U.S. RDA of these nutrients





# The Diet Balancing Act With Poultry Products

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The food guide pyramid and its role in human nutrition
- The nutrients found in the food pyramid
- To identify examples of foods that provide these nutrients
- To identify the role of poultry products in a balanced diet

#### ABOUT THEMSELVES:

- The adequacy of their diet
- What adjustments are needed in their food habits

#### Materials Needed:

- Member Handout 18, Food Nutrient Check-Off
- Member Handout 19, Food Guide Pyramid
- Member Handout 20, Nutritive Value of Selected Foods
- Member Handout 21, Recommended Daily Dietary Allowances for Humans

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### ACTIVITY:

Food alone cannot make you healthy. But healthful eating habits, which include moderation and a variety of foods, can help. Many American diets have too many calories and too much fat, cholesterol and sodium, and too little complex carbohydrates and fiber.

These six dietary guidelines are recommended for good health.

1. **Eat a variety of foods.** Because no one food contains all the nutrients, it is necessary to eat a variety of foods within the food pyramid—dairy products, fruits, vegetables, grains and meat/eggs.

<b>Food Group</b>	<b>Major Contribution to Diet</b>
Dairy products	Protein, vitamins A & D, riboflavin, calcium, phosphorous
Fruits	Fiber, vitamins A & C, minerals, folic acid
Vegetables	Fiber, vitamins A & C, various minerals
Grains	Protein, carbohydrates, fiber, iron, B-complex vitamins
Meat and eggs	Protein, B-complex vitamins, iron, zinc

Eggs and poultry are part of the meat group. Roasted, skinless poultry meat has less fat (calories) and cholesterol than other meats.

#### Leader Notes

Give members Member Handout 19, Food Guide Pyramid. Have members list examples of foods for each section.

Use Member Handout 20, Nutritive Value of Selected Foods. Prepare a visual showing the major nutrients eggs and chicken contribute to the diet.

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## Leader Notes

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- 2. Maintain a healthy weight.** What weight is right for you? There is no definite answer to this question because youth come in all sizes and shapes. Children need energy to grow and develop normally. Overweight or underweight children may need help in choosing nutritious diets.
- 3. Choose a diet low in fat, saturated fat and cholesterol.** Eating less fat makes sense because fat is linked with being overweight. A diet high in fat gives more energy than you need, but often less of other nutrients. Skinless poultry meat and eggs are high in protein and low in fat.
- 4. Choose a diet with plenty of vegetables, fruits, and grain products.** These foods are especially important for their starches and fiber, and are generally low in fat.

Many egg dishes combine a variety of different foods, including those high in starch and fiber. For example, omelets and souffles can use foods from the meat, milk, fruit and vegetable groups. Quiches can use foods from all these groups, including the grain (bread) group.

Use Member Handout 20, Nutritive Value of Selective Foods, to show members the nutritive composition of popular foods such as soft drinks, potato chips, etc. Compare these to the eggs and chicken handout used earlier.

- 5. Use sugars only in moderation.** Sugars are widespread in nature, occurring in fruits, vegetables, honey, legumes, grains and milk. Table sugar and sugar from corn syrups provide most of the sugar in the average diet. Many snack foods and beverages that are high in sugar have a low protein, vitamin and mineral content.

Sugar and starch (which breaks down into sugar) are sources of energy, but contain few other nutrients. Eating foods that contain large amounts of sugar and starch should be avoided because they may keep you from eating more nutritious foods, and can contribute to tooth decay and being overweight. Desserts containing eggs as the main ingredient are relatively low in sugar.

Conclude the lesson with Member Handout 18, Food and Nutrient Check-off.

- 6. Use salt in moderation.** Salt is essential in the diet. However, most Americans consume more salt than they need. Snack foods, such as chips, crackers, pretzels, and nuts, are high in salt. Unsalted eggs and poultry meat are naturally low in salt.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What is one new fact you learned from this lesson?
2. What would you like to know more about? Why?

#### **Process:**

3. Why is it important to eat a variety of foods?
4. Why are vegetables, fruits and grains so important?

**Generalize:**

5. Which of the six dietary guidelines are most critical for your age? Why?
6. What basic food group do you have the most trouble including in your diet? Why?

**Apply:**

7. What will you do differently in the future as a result of this lesson?
8. What, besides the food you eat, influences your health? How?

**GOING FURTHER:**

- Keep a record for several days of the types of foods you eat. Are you getting a well-balanced diet?

**REFERENCES:**

*Nutrition and Your Health: Dietary Guidelines for Americans*, Home and Garden Bulletin, Third Edition, USDA and USDHHS

*The Balancing Act*, Egg Nutrition Center, 2301 M Street, NW, Suite 405, Washington, DC 20037

*Nutritive Value of Foods*, USDA Home and Garden Bulletin, Number 72

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**THE DIET BALANCING ACT WITH POULTRY PRODUCTS**  
**POULTRY, LEVEL II**  
**Member Handout 18, Food Nutrient Check-off**

<b>Nutrient</b>	<b>Chicken</b>	<b>Eggs</b>	<b>Fruits and Vegetables</b>	<b>Dairy Products</b>	<b>Grains</b>
<b>B-Vitamins</b>					
<b>Carbohydrates</b>					
<b>Calcium</b>					
<b>Protein</b>					
<b>Iron</b>					
<b>Vitamin A</b>					
<b>Vitamin C</b>					

Under each food item, check the major nutrients it supplies to your diet.

**THE DIET BALANCING ACT WITH POULTRY PRODUCTS**  
**POULTRY, LEVEL II**  
**Member Handout 19, Food Guide Pyramid**

Fats, Oils & Sweets  
**Use Sparingly**

- ◼ Fat (naturally occurring and added)
- ◻ Sugars (added)

These symbols show fats, oils and added sugars in foods.

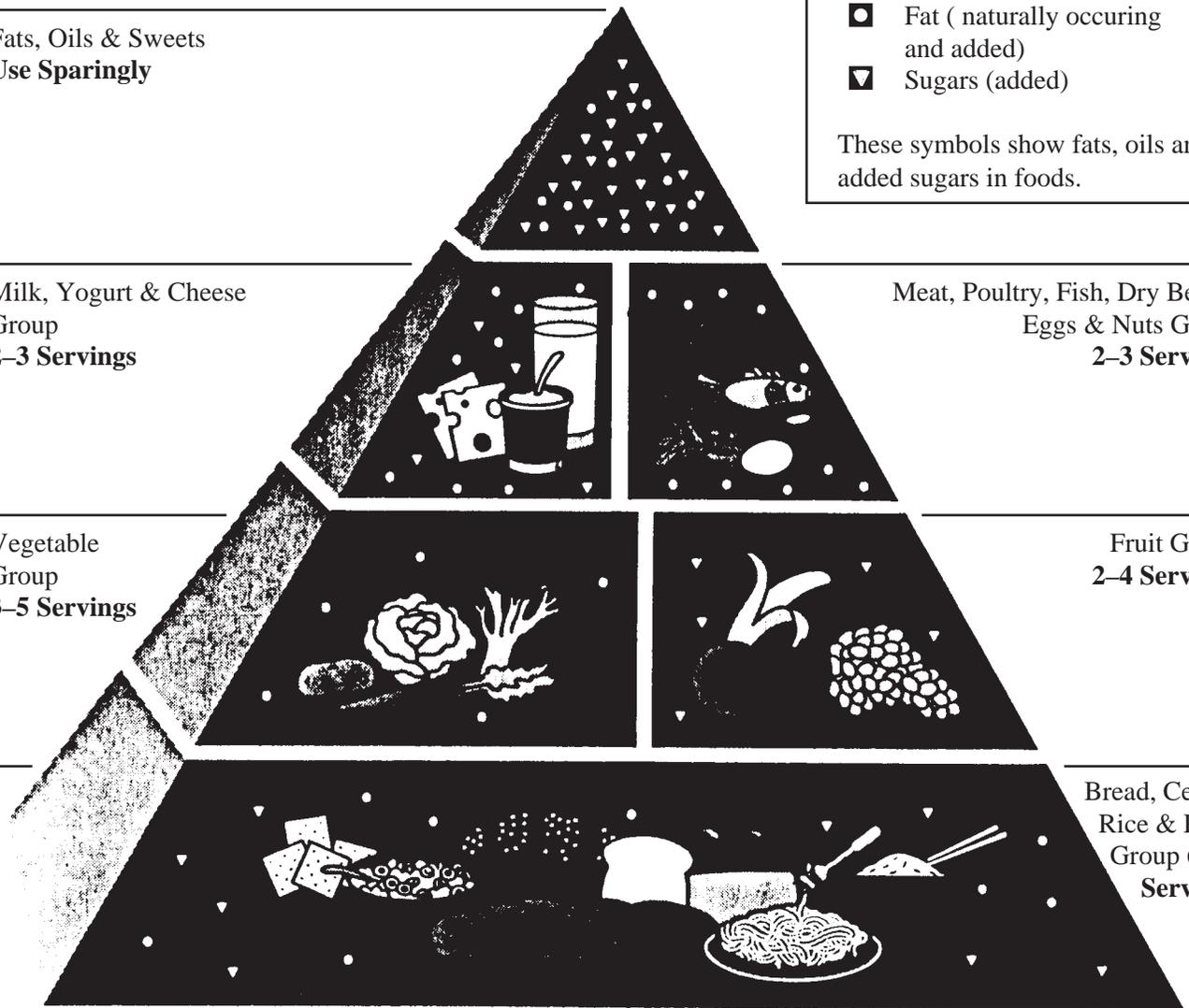
Milk, Yogurt & Cheese  
 Group  
**2-3 Servings**

Meat, Poultry, Fish, Dry Beans,  
 Eggs & Nuts Group  
**2-3 Servings**

Vegetable  
 Group  
**3-5 Servings**

Fruit Group  
**2-4 Servings**

Bread, Cereal,  
 Rice & Pasta  
 Group **6-11 Servings**



# THE DIET BALANCING ACT WITH POULTRY PRODUCTS

## POULTRY, LEVEL II

### Member Handout 20, Nutritive Value of Selected Foods

Food	Energy Cal	Protein Grams	Fat Grams	Ca MG	P MG	Iron MG	Sodium MG	Vit A IU	Thiamin MG	Riboflavin MG	Ascorbic Acid	
											MG	MG
Reg Cola (12 oz)	160	0	0	11	52	.2	18	0	0	0	0	0
Milk, 2% (1 cup)	120	8	5	297	232	.1	122	500	.10	.40	.2	2
Ice Milk, 4% (1 c)	185	5	6	176	129	.2	105	210	.08	.35	.1	1
Egg, lg, fried	95	6	7	29	91	1.1	162	320	.04	.14	Trace	0
Fishstick (4"x1"x 1/2")	70	6	3	11	58	.3	53	20	.03	.05	.6	0
Apple, raw (2 3/4" diam)	80	Trace	Trace	10	10	.2	Trace	70	.02	.02	.1	8
Orange, raw (1 cup)	85	2	Trace	72	25	.2	Trace	370	.16	.07	.5	96
Bread, wheat (1 slice)	65	2	1	32	47	.9	138	Trace	.12	.08	1.2	Trace
Oatmeal, (1 cup)	145	6	2	19	178	1.6	2	40	.26	.05	.3	0
Cheerios (1 1/4 cup)	110	4	2	48	134	4.5	307	1250	.37	.43	5.0	15
Lucky Charms (1 cup)	110	3	1	32	79	4.5	201	1250	.37	.43	5.0	15
Donut, glazed (1)	235	4	13	17	55	1.4	222	Trace	.28	.12	1.8	0
Peanuts, salted (1 cup)	840	39	71	125	734	2.8	626	0	.42	.15	21.5	0
Hamburger, 4 oz	445	25	21	75	225	4.8	763	160	.38	.38	7.8	1
Chicken breast, fried (3.5 oz)	220	31	9	16	228	1.2	74	50	.08	.13	13.5	0
Candy, milk choc (1 oz)	145	2	9	50	61	.4	23	30	.02	.10	.1	Trace
Green beans (1 cup)	25	2	Trace	35	26	1.2	339	470	.02	.08	.3	6
Carrot, raw (1)	30	1	Trace	19	32	.4	25	20,250	.07	.04	.7	7
Corn, canned (1 cup)	165	5	1	11	134	.9	571	510	.09	.15	2.5	17
Potato chips (10)	105	1	7	5	31	.2	94	0	.03	Trace	.8	8

Source: Nutritive Value of Foods, USDA, Home and Garden Bulletin, Number 72, Revised 1981

# THE DIET BALANCING ACT WITH POULTRY PRODUCTS

## POULTRY, LEVEL II

### Member Handout 21, Recommended Daily Dietary Allowances (RDA) for Humans

Designed for the maintenance of good nutrition of practically all healthy persons in the United States.

Sex-age category	Persons						Food energy Calories	Protein Grams	Minerals			Vitamin A Retinol Inter- national- units <sup>3</sup>	Thia- min Milli- grams	Ribo- flavin grams	Nia- cin grams	Ascor- bic acid grams	
	Age Years From To	Weight Kilo- Pounds grams		Height Centi- Inches meters		Cal- cium Milli- grams			Phos- phorus Milli- grams	Iron Milli- grams							
Infants	0	0.5	6	13	60	24	kg × 115 lb × 52.3	kg × 2.2 lb × 1.0	360	240	10	420	1,400	0.3	0.4	6	35
	0.5	1	9	20	71	28	kg × 105 lb × 47.7	kg × 2.0 lb × 0.9	540	360	15	400	2,000	.5	.6	8	35
Children	1	3	13	29	90	35	1,300	23	800	800	15	400	2,000	.7	.8	9	45
	4	6	20	44	112	44	1,700	30	800	800	10	500	2,500	.9	1.0	11	45
	7	10	28	62	132	52	2,400	34	800	800	10	700	3,300	1.2	1.4	16	45
Males	11	14	45	99	157	62	2,700	45	1,200	1,200	18	1,000	5,000	1.4	1.6	18	50
	15	18	66	145	176	69	2,800	56	1,200	1,200	18	1,000	5,000	1.4	1.7	18	60
	19	22	70	154	177	70	2,900	56	800	800	10	1,000	5,000	1.5	1.7	19	60
	23	50	70	154	178	70	2,700	56	800	800	10	1,000	5,000	1.4	1.6	18	60
	51+		70	154	178	70	2,400	56	800	800	10	1,000	5,000	1.2	1.4	16	60
Females	11	14	46	101	157	62	2,200	46	1,200	1,200	18	800	4,000	1.1	1.3	15	50
	15	18	55	120	163	64	2,100	46	1,200	1,200	18	800	4,000	1.1	1.3	14	60
	19	22	55	120	163	64	2,100	44	800	800	18	800	4,000	1.1	1.3	14	60
	23	50	55	120	163	64	2,000	44	800	800	18	800	4,000	1.0	1.2	13	60
	51+		55	120	163	64	1,800	44	800	800	10	800	4,000	1.0	1.2	13	60
Pregnant							+300	+30	+400	+400	<sup>5</sup> 18+	+200	+1,000	+4	+3	+2	+20
Lactating							+500	+20	+400	+400	18	+400	+2,000	+5	+5	+5	+40

1. Source: Adapted from Recommended Dietary Allowances. 9th ed., 1980. 185 pp. Washington DC: National Academy of Sciences, National Research Council. Also available on libraries. This publication tabulates the RDA for selected nutrients, discusses the basis for all RDA and reviews current knowledge of the dietary needs for other nutrients.

2.1 retinol equivalent = 1 µg retinol or 6 µg beta-carotene.

3.1 international unit = 0.3 µg retinol or 0.6 µg beta-carotene.

4. After age 75 years, energy requirement is 2,050 calories for males and 1,600 calories for females.

5. The increased requirement cannot be met by ordinary diets, therefore the use of supplemental iron is recommended.

Note—The Recommended Daily Dietary Allowances (RDA) should not be confused with the U.S. Recommended Daily Allowances (U.S. RDA). The RDA are amounts of nutrients recommended by the Food and Nutrition Board of the National Research Council and are considered adequate for maintenance of good nutrition in healthy

persons in the United States. The allowances are revised from time to time in accordance with newer knowledge of nutritional needs.

The U.S. RDA are the amounts of protein, vitamins and minerals established by the Food and Drug Administration as standards for nutrition labeling. These allowances were derived from the RDA set by the Food and Nutrition Board. The U.S. RDA for most nutrients approximates the highest RDA of the neo-age categories in this table, including the allowances for pregnant and lactating females. Therefore, a diet that furnishes the U.S. RDA for a nutrient will furnish the RDA for most people and more than the RDA for many. U.S. RDA are protein, 45 grams (eggs, fish, meat, milk, poultry) 65 grams (other foods); vitamin A, 5,000 International Units; thiamin, 1.5 milligrams; riboflavin, 1.7 milligrams; niacin, 20 milligrams; ascorbic acid, 60 milligrams; calcium, 1 gram; phosphorus, 1 gram; iron 18 milligrams. For additional information on U.S. RDA, see the "Federal Register," vol. 38, no.49 (March 14, 1973), pp. 6959-6960, and Agriculture Information Bulletin 362, "Nutrition Labeling—Tools for Its Use."





# Use of Poultry Products

## *Poultry, Level II*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The difference between edible and nonedible poultry products
- Five edible uses of poultry products
- Five nonedible uses of poultry products
- Five nonedible uses of egg byproducts

#### ABOUT THEMSELVES:

- Their feelings about the value of poultry products in their daily lives
- Their feelings about the importance of recycling poultry wastes

#### Materials Needed:

- Magazines and newspapers containing advertisements that depict different poultry products

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### ACTIVITY:

#### Leader Notes

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Poultry products are either **edible** (fit for human consumption) or **nonedible** (not fit for human consumption). Although eggs and poultry meat are major parts of the human diet, we also benefit from many nonedible products that are produced by the poultry industry.

#### EDIBLE PRODUCTS

Eggs and poultry meat are classified as a protein food. About 70 percent of the eggs consumed in the US are purchased as shell eggs and served in the fried, hard cooked or scrambled forms. The other 30 percent are used in a wide range of food products because of the egg's **functional** properties they add to foods. Egg white is used in pie meringues and in angel food cakes because of its **leavening** property, or its ability to make them rise. The egg yolk is used in meatloaf and in coatings on fried chicken because of its **binding** ability. Egg yolk is used in mayonnaise because it adds a natural yellow **color** to the product and because it contains an **emulsifying** agent that keeps the oil and water from separating. Lastly, the egg is used in foods because of its excellent **nutritional** value.

Poultry meat is a very popular item in the American diet because it is economical, highly nutritious and available in many different forms such as parts, ground turkey, breast fillets, etc. These are called **value-added** or **further-processed** products because the processor has increased the product's value by increasing the convenience of their preparation.

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## Leader Notes

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### NONEDIBLE PRODUCTS

There are many nonedible products produced by the poultry industry. Although some of these products are still wasted, the industry is making progress in using them.

**Poultry manure** is in high demand for use as a fertilizer, a feed ingredient and in the production of methane gas. **Feathers** are used for livestock feed, ornaments, some sporting equipment (arrows), bedding (down-filled blankets) and clothing. **Offal** which consists of the heads, feet and nonedible internal organs is used in various types of feed. **Blood** can be used for fish bait, fertilizer and feed. **Grease** extracted from the offal is used in feed.

Nonedible byproducts from eggs have many uses. The most significant use of eggs other than for human food is for **reproduction**. Other uses are: the addition of nonedible eggs in **pet foods**; the production of biological products such as **vaccines** and **growth media** for microorganisms; the use of egg yolk in **preservation of sperm, tanning of leather, shampoos and lotions**; the use of egg white in **adhesives**; and the use of the intact egg shell as an **art medium**.

Do at least one of the following activities with your group: (1) visit a supermarket and record as many items as you can that contain poultry products, (2) prepare a scrapbook of product labels or advertisements of edible and nonedible poultry product uses or (3) compare the price per pound of a whole broiler or turkey to that of ground chicken or turkey, chicken patties or chicken or turkey frankfurters. Discuss reasons for differences in prices.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What activity did you choose? Why?
2. What was the most unusual or interesting thing you learned from your activity?

#### Process:

3. What are some important uses for non-edible poultry products?
4. What is the significance of value-added poultry products?

#### Generalize:

5. How many of the products do you use?
6. How did you decide to use these products? Why?

#### Apply:

7. What products do you feel you will use in the future that you do not currently use? Why?

**GOING FURTHER:**

- Study recycling aspects of poultry manure and share with your group and others.
- Explore how poultry manure is used to produce methane gas.
- Give a presentation on uses of feathers and show examples.
- Give a presentation on egg byproducts and their value to humans.
- Have someone demonstrate the use of an egg shell as an art form.

**REFERENCES:**

**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed by:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

**Think Back:**

What are the nutritional pros and cons of poultry products?

Note: List these on a separate sheet to include in your record book.

Complete step 8 of your Member Guide and Annual Report.

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# Kansas 4-H Poultry Leader Notebook

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# Advancing in the Poultry Project by Reaching Goals

*Poultry, Level III*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- To set goals for their poultry project
- To explore various areas for poultry projects

### ABOUT THEMSELVES:

- Understanding the importance of overcoming barriers

## Materials Needed:

- Flip chart and markers or chalkboard and chalk
- Poultry Member Guide and Annual Report (MG-26)
- Activity Sheet 1, Barriers to Reaching My Goals (two copies)

**ACTIVITY TIME NEEDED:** 40 MINUTES

## ACTIVITY:

As you become older, you can branch out into a variety of areas related to the poultry project. This lesson is prepared to guide members into different areas of interest through a goal-setting process.

Some lesson suggestions might be:

- Proper handling of hatching eggs
- Learning basic nutritional needs of poultry
- Effect of light on chickens
- Flight adaptations
- Egg grading
- Processing poultry meat

### Goal setting

After having had time to see all the topics that can be addressed when raising poultry, it is time to make some goals for the year.

Let's think about possible barriers that might prevent us from reaching our goals.

### Barriers

It is important to know how to cope with and eliminate barriers that might stop you from reaching your goals. Some major barriers to reaching goals can include time, money, resources, knowledge or ability.

When you have completed question 1, fill out your Poultry Member Guide and Annual Report, for MAP STEPS 1 through 3.

## Leader Notes

Ask the members what different things they would like to learn about poultry. List these on the board.

Hand out Poultry Member Guide and Annual Report, MG-26.

In groups of two or three members, fill out question 1 on Activity Sheet 1.

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## Leader Notes

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In groups of two or three members, fill out question 2 on Activity Sheet 1.

The best way to deal with barriers is to design strategies of how you will overcome the barrier.

For each step you've listed on your Poultry Member Guide and Annual Report, identify a barrier you think could possibly prevent you from reaching your goal.

Now, identify with two or three group members some ways of overcoming those barriers in question 3.

For question 4 identify what you think will be the biggest personal barrier you will encounter this year and how you plan to overcome it.

Now using your Poultry Member Guide and Annual Report, complete MAP STEPS 4 through 7. Use a second copy of Activity Sheet 1, Barriers to Reaching Goals, to analyze your second major goal.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What is a barrier to reaching goals that has to do with time?
2. What is a barrier to reaching goals that has to do with money?

#### **Process:**

3. Why is it important to know possible barriers that might prevent you from reaching your goals?
4. How will you overcome barriers that prevent you from reaching your goals?

#### **Generalize:**

5. What frustrations occurred when you discussed barriers? Why?
6. How do you deal with the frustrations that result from working with barriers?

#### **Apply:**

7. What are some barriers you may face in the future?

### **GOING FURTHER:**

- Teach this goal-setting process to other 4-H members or groups.

### **REFERENCES:**

#### **Author:**

James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed By:**

Poultry Design Team

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**ADVANCING IN THE POULTRY PROJECT BY REACHING GOALS**  
**POULTRY, LEVEL III**  
**Activity Sheet 1, Barriers to Reaching My Goals**

1. **BARRIER:** What might be a barrier to reaching a goal that could include?

time: \_\_\_\_\_

money: \_\_\_\_\_

resources: \_\_\_\_\_

knowledge: \_\_\_\_\_

ability: \_\_\_\_\_

other barriers: \_\_\_\_\_

2. **OVERCOMING BARRIERS:** What are some barriers you might encounter when reaching your goals?  
For MAP STEP 2

Barrier 1: \_\_\_\_\_

Barrier 2: \_\_\_\_\_

Barrier 3: \_\_\_\_\_

Barrier 4: \_\_\_\_\_

Barrier 5: \_\_\_\_\_

3. **STRATEGIES FOR OVERCOMING BARRIERS:** How will you overcome the barriers that might prevent you from reaching your goal?  
For MAP STEP 2

Strategy 1: \_\_\_\_\_

Strategy 2: \_\_\_\_\_

Strategy 3: \_\_\_\_\_

Strategy 4: \_\_\_\_\_

Strategy 5: \_\_\_\_\_

4. **YOUR PERSONAL BARRIER:** What do you think will be your biggest barrier to overcome during the next year for your poultry project and how do you plan to overcome it?

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# Poultry Mating and Courtship

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The physical behavior and secondary sex characteristics of poultry during courtship

#### **ABOUT THEMSELVES:**

- Importance of planning and preparation

#### **Materials Needed:**

- Member Handout 1, Mating Behavior Diagrams: Chickens, Ducks

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

---

It is important for you to know the sexual behavior of the animals with which you are working. Sexual behavior involves courtship and mating rituals and is usually controlled by hormones.

#### **CHICKENS**

Mating in chickens is preceded by various behavior patterns known as displays or courting, which accompany sexual activities of males and females.

Courting by the cock may be exhibited in three ways:

1. by waltzing, fluttering his wings or dancing,
2. by extending his head and grasping the hen's comb or neck feathers,  
or
3. by chasing the hen, grasping her comb or neck feathers; mounting, grasping the comb or neck feathers and treading.

The hen may respond to courting in any of three ways:

1. acting indifferently
2. acting negatively
  - by stepping aside
  - by walking or running away
  - by struggling
3. acting positively
  - by crouching, often with her head low and wings spread, moving tail to one side
  - by everting cloaca

*NOTE:* Any of the above may be accompanied by vocalization, ranging from faint screams to loud squawks.

### TURKEYS

In contrast to chickens, a receptive turkey hen invites copulation by assuming a marked sexual crouch in front of a tom in full display. The tom's display includes gobbling, elaborate movements and fanning of tail feathers, strutting and puffing air in the air sacs. The turkey hen is not receptive to the tom for periods of several days after either successful or unsuccessful mating, both of which involve eversion of the vagina.

### DUCKS

Ducks usually bond into pairs. Social courtship displays and displays associated with pair formation occur only during the autumn, winter and early spring months.

The female courtship displays may include the following:

1. **Inciting**—a display associated with the pairing and maintenance of the pair-bond. It indicates the female's choice of one male and rejection of another. The female usually moves beside or behind a chosen male, makes threatening movements over one shoulder, and utters loud calls.
2. **Nod-swimming**—the female holds her head high but moves it forward and backward.
3. **Repulsion**—this behavior usually occurs when females are incubating or brooding, and are harassed by the drake. The female tucks her head back, opens her bill, ruffles the plumage on her back and flanks, fans her tail and emits loud, harsh calls.
4. **Distraction Displays**—in this setting, the female thrashes both wings, flaps across the ground or water and squawks loudly.

The male may exhibit:

1. **Preliminary Displays**—the male takes on a pose with his head sunk in the shoulders, ruffles his head feathers, shakes his head and wags his tail.
2. **Major Courtship Displays**—usually occur suddenly in the drake. Some examples are:
  - **Grunt-whistle**—The drake lowers his bill into the water surface, arches his body, flicks his bill to one side, sending a fine spray of water toward the female, and utters a loud whistle followed by a grunt.
  - **Head-up, tail-up**—The drake makes complex movements by the sudden raising of his head, cocking of the tail and raising the closed wings, and makes a loud whistle.
  - **Down-up**—The drake dips his breast deeply into the water, jerks his bill upward and flips water as he goes, raises his tail high out of the water and whistles when his head is at the highest level.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**

1. What are some courting behaviors of chickens?
2. What are some courting behaviors of ducks?

**Process:**

3. Which gender initiates courtship in chickens? Turkeys? Ducks?
4. What behavior is significant in ducks as compared to chickens and turkeys? (Pairing)
5. Which courtship behaviors were most easily identified in chickens? Turkeys? Ducks?

**Generalize:**

6. Why is it important to be able to identify courting and mating behaviors in other farm animals?

**Apply:**

7. How can the observation of mating behavior help you plan and prepare for future production?

**GOING FURTHER:**

- Visit a small poultry flock and observe the behaviors of the birds.
- Prepare and present a talk about the mating behaviors at your next 4-H meeting or school class.
- Discuss the practice of artificial insemination and its practicality in birds.

**REFERENCES:**

*Poultry Science*, Ensminger  
*Domestic Animal Behavior*, Craig

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## Leader Notes

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Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

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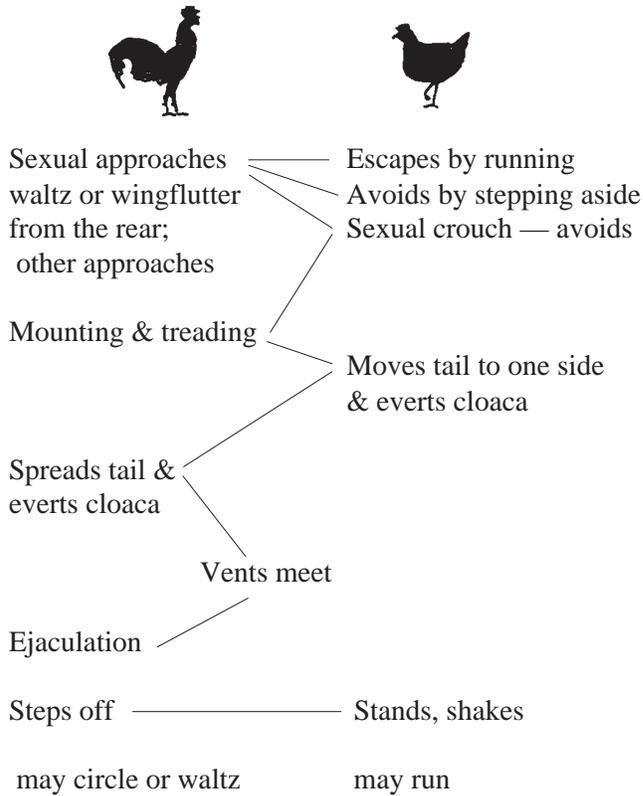
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# POULTRY DATING GAME

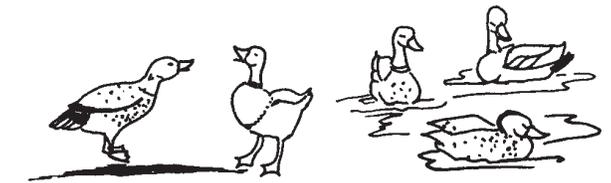
## POULTRY, LEVEL III

### Member Handout 1, Mating Behavior Diagrams: Chickens, Ducks

#### CHICKENS



#### DUCKS

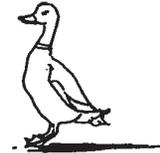


The “rab rab” chatter of a Mallard pair (hen left; drake right) calms both members.

A female (in foreground) nod-swimming among drakes.



Rejection-gesture used by the female when harassed by drakes intent on forced mating.



In this posture, the drake utters the attraction and warning call, “rab.”



Headshake of the drake



Grunt-whistle of the drake



Head-up, tail-up of the drake





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# Reproduction and Fertilization of Poultry

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The parts of a female bird's reproductive tract
- The parts of a male bird's reproductive system
- To trace paths of egg (ovum) and sperm to complete fertilization

#### ABOUT THEMSELVES:

- The contribution of each part to the success of a whole system

#### Materials Needed:

- Activity Sheet 1, Hen's Reproductive Tract
- Leader's Key, Activity Sheet 1, Hen's Reproductive Tract
- Pencils for each member
- Tape
- Small pieces of paper with the names of the parts of the hen's reproductive tract
- Member Handout 2, Time Frame for Egg Formation
- Member Handout 3, Genital Organs: Cock and Hen

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### ACTIVITY:

What is a hen's purpose? Basically, it is to lay eggs to be used as food or for hatching. A hen's body is specially designed to form eggs. The reproductive system of a bird is different from that of mammals. The most obvious difference is the egg is fertilized, supplied with nutrients, surrounded by a shell and expelled from the body in birds. In contrast, the fertilized egg of mammals remains in the reproductive tract until birth.

#### Female Reproductive System

These are the different parts of the hen's reproductive tract. It is the same as on your paper. The egg-making machinery of the hen consists of two main parts: the **ovary** and the **oviduct**.

This is the **ovary**. The ovum or yolk develops here. The hen has two ovaries, but only the left one is functional. It is located in the body cavity near the backbone. An ovary contains several thousand egg yolks (ova) which are present at the time the female chick is hatched.

This is the **follicle**. The follicle is a thin-walled sac containing blood vessels which supply the yolk materials and contain the yolk until its release.

#### Leader Notes

Give each member Activity Sheet 1, Hen's Reproductive Tract. List the names of the various parts of the ovary and oviduct on a flip chart or chalkboard. See how many parts members can identify on their handout before discussing parts and egg formation pathway. Ask members to discuss each part and its function before giving the correct answer. Ask: what? how? why? and other follow-ups to their comments. Another approach would be to make a large poster of Activity Sheet 1, Hen's Reproductive Tract. Write the names of the parts on slips of paper and let each member place the name to a part on the poster. Give the group time to reach a consensus on correct labeling before asking the group to explain and discuss their decisions.

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## Leader Notes

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This is the **stigma**. This is a line devoid of blood vessels on the follicle wall where it ruptures to release the yolk. This process is called **ovulation**.

This is the **oviduct**. Egg formation is completed as the yolk travels down the oviduct. The oviduct is divided into five sections:

1. The **infundibulum**. This is the section that picks up the released yolk from the ruptured follicle. Fertilization occurs here if live sperm are present.
2. The **magnum**. Thick white (albumen) is deposited around the yolk and the shape of the egg is formed in this section.
3. The **isthmus**. Inner and outer shell membranes are added here.
4. The **uterus**. It is also known as the shell gland. First, thin albumen consisting mainly of water and salts is added. Then, calcium is added to the shell membranes, forming the hard shell. If the shell is going to be colored, pigment is added in this section.
5. The **vagina**. This section connects the oviduct with the cloaca. The egg is held here until laid.
6. The **cloaca**. This is the external opening to the reproductive and digestive tracts.

Pass out Member Handout 2, Time Frame for Egg Formation.

A normal hen requires 22 to 26 hours to complete an egg. Within 30 minutes after the egg is laid another yolk is released from the ovary if the hen is going to lay the following day

### Male Reproductive System

Pass out Member Handout 3, Genital Organs: Cock and Hen.

The male bird's reproductive system is simple. Let's look at the diagram and identify the parts.

The male bird has two **testes**. This is where the sperm are made. They also contain endocrine cells which secrete the male sex hormone, androgen, which is responsible for development of secondary sex characteristics, such as development of the comb, spurs, crowing and feather shape. The testes are located in the body cavity rather than in a scrotum like mammals.

The **ductus deferens** store sperm and transport it from the testes to the copulatory organ.

The **copulatory apparatus** consists of two **papillae**, which are located in the vent. It is more developed in ducks and geese than in chickens and turkeys.

During the act of copulation (mating) between the male and female, the papillae of the male become erected and deposit semen on the everted vagina of the female. The sperm travels up the female's reproductive tract. Fertilization (joining of the sperm and ovum) takes place in the infundibulum soon after ovulation and before the egg reaches the magnum. Avian sperm will survive in the body of the female for several days or weeks, depending on the species, compared to a few hours in mammals.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many parts of the hen's reproductive tract could you identify?
2. What parts of the cock's reproductive tract could you identify?

#### **Process:**

3. How many ova or yolks does a newborn female chick have?
4. What is the path taken by the ova from the ovary until it is laid as an egg? List the time spent in each part of the reproductive tract and what part of the egg is formed at each location.

#### **Generalize:**

5. How does a hen's ova/egg differ from a cow's ova?
6. How is a bird's reproductive system different from that of mammals? (Consider both sexes.)

#### **Apply:**

7. How is the understanding of the hen's reproductive system useful to the poultry industry?
8. How important do you think artificial insemination is in the poultry industry? Why?

### **GOING FURTHER:**

- Give a talk on the development of an egg to your class at school.
- Visit a farm flock and take pictures or observe chickens mating.

### **REFERENCES:**

*Poultry Science*, M.E. Ensminger

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## Leader Notes

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Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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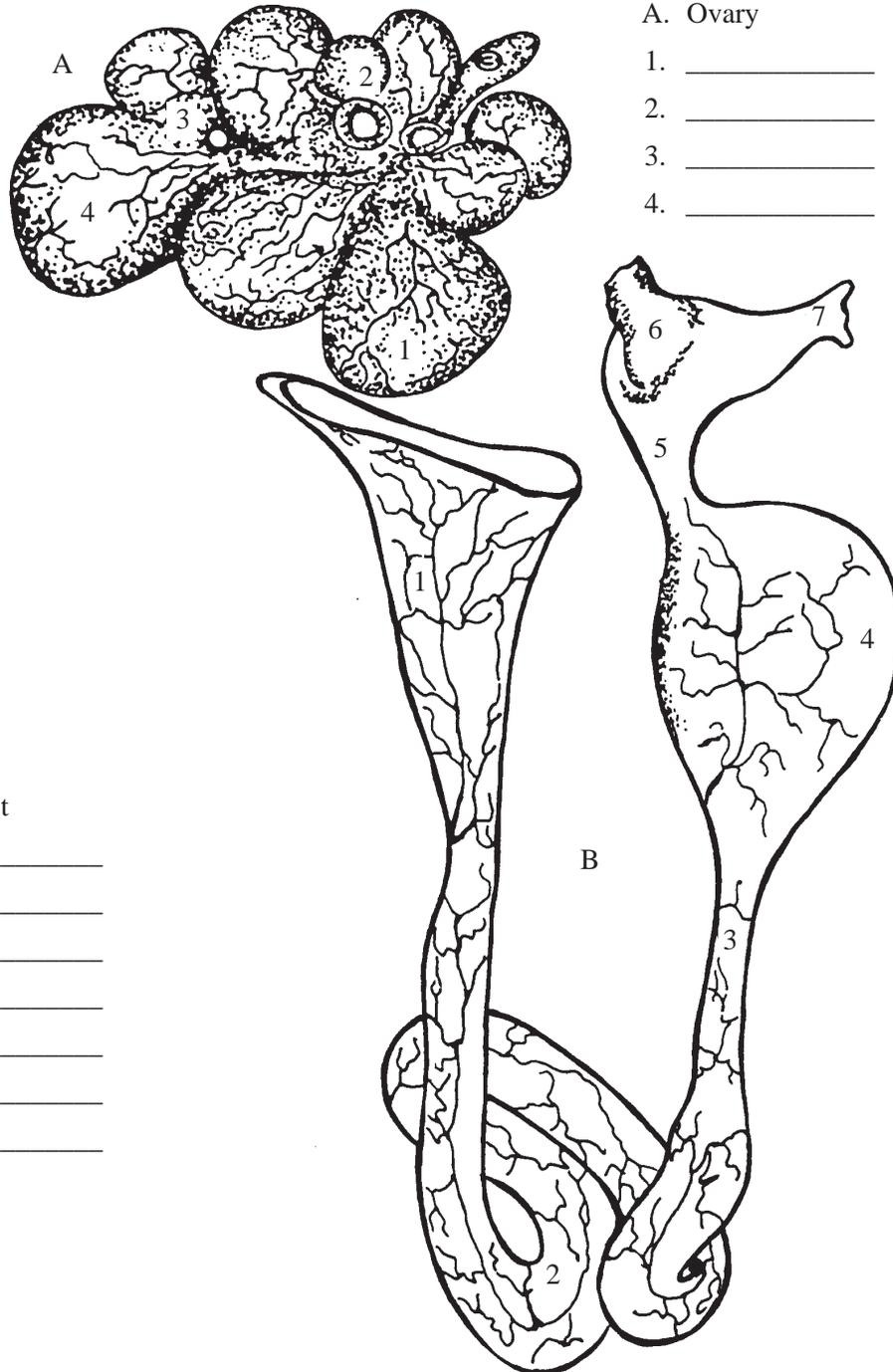
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**REPRODUCTION AND FERTILIZATION OF POULTRY**  
**POULTRY, LEVEL III**  
**Activity Sheet 1, Hen's Reproductive Tract**

Label the parts of the ovary and oviduct.



A. Ovary

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

B. Oviduct

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

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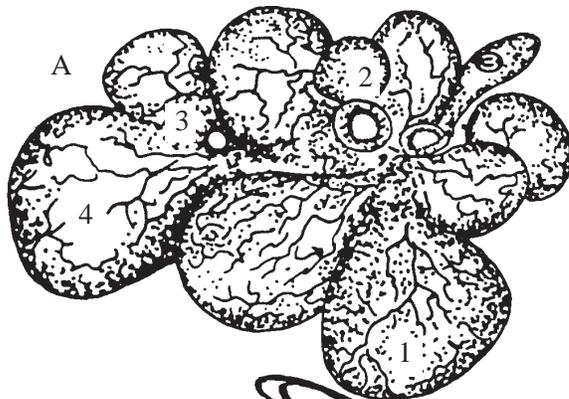
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# REPRODUCTION AND FERTILIZATION OF POULTRY

## POULTRY, LEVEL III

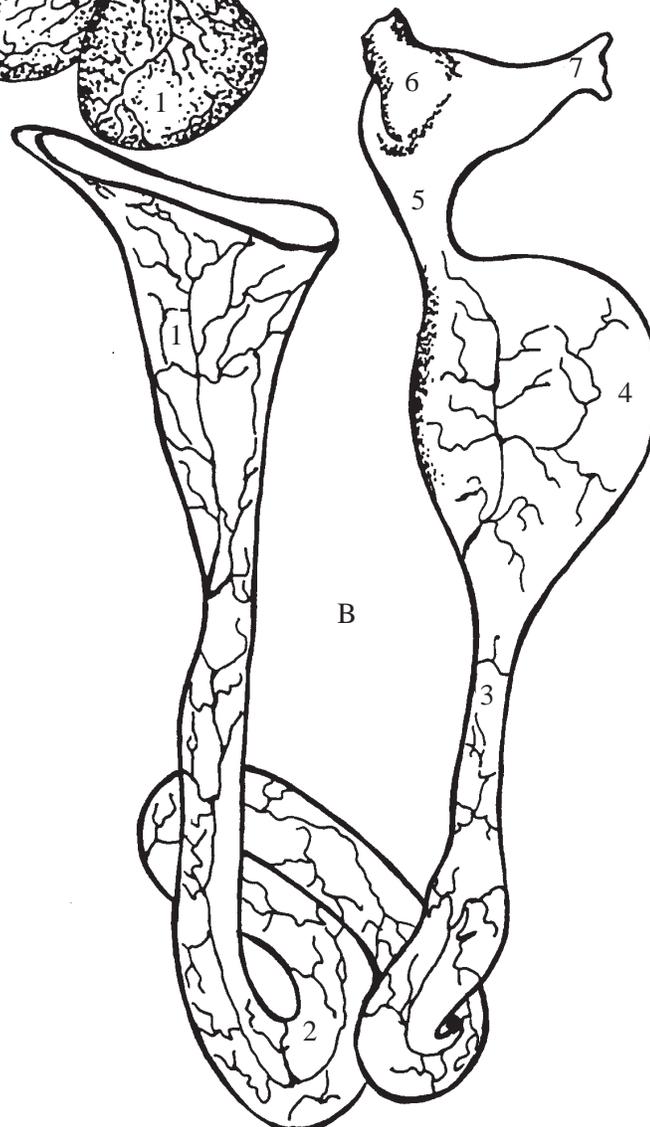
### Leader's Key, Activity Sheet 1, Hen's Reproductive Tract

Label the parts of the ovary and oviduct.



#### A. Ovary

1. Mature yolk within yolk sac or follicle
2. Immature yolk
3. Empty follicle
4. Stigma or suture line



#### B. Oviduct

1. Infundibulum
2. Magnum
3. Isthmus
4. Uterus
5. Vagina
6. Cloaca
7. Vent

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**REPRODUCTION AND FERTILIZATION OF POULTRY**  
**POULTRY, LEVEL III**  
**Member Handout 2, Time Frame for Egg Formation**

<b>Section</b>	<b>Time Egg Spends in Section</b>	<b>Function</b>
Infundibulum	15 minutes	Engulfing of yolk, site of fertilization
Magnum	3 hours	Secretion of thick white (high in protein)
Isthmus	15 minutes	Formation of two shell membranes
Uterus	20-21 hours	Addition of thin albumen consists mainly of water and salts; hard white shell, and shell pigment are added
Vagina		Passage of egg

**Think Back:**

What do you think is the most significant aspect of poultry reproduction? Why?

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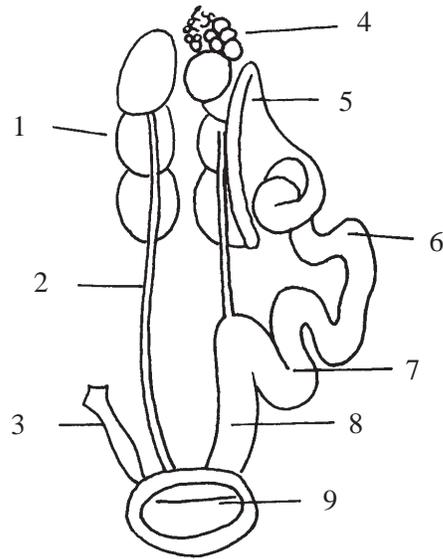
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# REPRODUCTION AND FERTILIZATION OF POULTRY

## POULTRY, LEVEL III

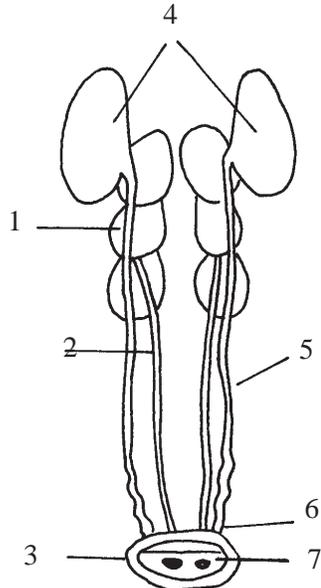
### Member Handout 3, Genital Organs: Cock and Hen

Genital Organs of the Hen



1. Kidney
2. Ureter
3. Rudimentary right oviduct
4. Left ovary
5. Infundibulum of oviduct
6. Magnum of oviduct
7. Isthmus of oviduct
8. Uterus of oviduct
9. Cloaca

Genital Organs of the Cock



1. Kidneys
2. Ureter
3. Cloaca
4. Testes
5. Ductus deferens
6. Seminal vesicle
7. Papillae



# Proper Handling of Hatching Eggs

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The proper practices for handling eggs to be incubated
- Three reasons for poor hatchability in eggs

#### **ABOUT THEMSELVES:**

- The values of experimentation

### Materials Needed:

- Two and one-half dozen eggs for hatching
- Activity Sheet 2, Egg Handling Activities and Problems

### ACTIVITY TIME NEEDED: 30 MINUTES

### ACTIVITY:

### Leader Notes

---

Not all fertile eggs will hatch. The embryo may die any time between fertilization and hatching. Many embryos die during incubation because of the condition of the breeding flock, storage conditions prior to incubation and the incubator environment.

The structural development of the chick embryo starts soon after fertilization, which occurs approximately 24 to 26 hours before the egg is laid. Cell division continues as the egg travels down the oviduct of the hen. Proper handling of the egg after being laid is critical for a successful hatch. Improper handling of eggs during storage can weaken the germ or damage the egg, resulting in reduced hatchability.

The following practices for handling eggs are recommended:

1. **Gather eggs** frequently when temperatures are extremely cold or hot, to prevent chilling or overheating. If you gather eggs frequently, you will also prevent contamination from feces and nesting materials.
2. **Cleanliness.** Dry-clean slightly soiled eggs by rubbing them with fine sandpaper or steel wool. You can wash slightly soiled eggs in 105°F water containing a suitable detergent-sanitizer, but never wash eggs in water that is cooler than the eggs. If eggs are extremely soiled, they should not be used. Any sanitizer should be applied as soon as possible after the eggs are laid to prevent the growth of bacteria and penetration of the shell.

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## Leader Notes

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3. **Storage of Eggs.** Store your hatching eggs in a clean area at 55° to 65°F and 70 to 80 percent relative humidity, such as in a cool basement or cellar. After the egg is laid and the temperature drops, embryonic development stops. High humidity will help to prevent evaporation and an enlargement of the egg's air cell and improve hatchability. You should turn the eggs slightly once per day if they are to be held longer than seven days. This prevents the yolk from sticking to the shell.
4. **Hold eggs for minimum time.** Eggs should be set seven to 10 days after they are laid because hatchability decreases as holding time increases. Eggs should not be held longer than 10 days.
5. **Egg quality.** Eggs that are misshapen and either extremely large or small hatch poorly. Cracked eggs rarely hatch. Beeswax or a similar material can be used to seal cracks in very valuable eggs. The larger the egg the less the effect of a crack on hatchability.

Give each member Activity Sheet 2, Egg Handling Activities and Problems. Do these as a group or individually before using the dialogue questions. Make observations and discuss as you incubate some eggs. Note: problem 4a. requires 1,000 pullets  $\times 2 = 2,000$  straight-run chicks. Divide 2,000 chicks by .90 hatchability = 2,222 eggs set.

If you follow these simple procedures, you should have successful hatchability.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What changes in egg weight did you observe while doing the first activity?
2. What major embryo changes did you observe at each weight date?

#### **Process:**

3. What are the main causes of poor egg hatchability?
4. Why is the relative humidity important when storing eggs?

#### **Generalize:**

5. What happened to egg hatchability under the three treatments in the third activity? Why?

#### **Apply:**

6. What could you do differently to obtain different results, if you did the third activity again?

### **GOING FURTHER:**

- Visit a hatchery and observe their egg-handling procedures.
- Obtain a small, still air incubator and incubate some eggs.

### REFERENCES:

#### Author:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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## PROPER HANDLING OF HATCHING EGGS

### POULTRY, LEVEL III

#### Activity Sheet 2, Egg Handling

Do the following activities and problems.

1. **Selection and Traying of Hatching Eggs**—Select a dozen hatching eggs. Mark each egg with your initials and number them in consecutive order. Weigh each egg and record that weight at setting, 7 days, 14 days, and 20 days.
2. **Detection of Fertility in Incubated Eggs**—Candle each egg after it is weighed to determine fertility. Record observations.
3. **Effects of Various Conditions of Hatchability**—Make observations on hatchability on six eggs treated in each of the following ways:
  - a. No turning during incubation.
  - b. Trayed with large end down.
  - c. Eggs dipped in mineral oil.
4. **Problems**—Answer the following and discuss in your group.
  - a. How many eggs would have to be set to obtain 1,000 pullet chicks. Assume 90 percent hatchability of all eggs set. Show calculations.
  - b. What effect could low humidity during the hatching process have on chicks?
  - c. What should you do if the electrical power to an incubator was off for 2 to 3 hours?
  - d. Why does it take longer for the first set of eggs placed in an incubator to hatch than subsequent sets?



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# Embryonic Mortality

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Three critical periods of embryonic development
- Causes of embryonic mortality

#### ABOUT THEMSELVES:

- The value of planning and preparation

### Materials Needed:

- Cards with incubator climate conditions for skillathon
- Incubators and eggs for each member (if possible)

**ACTIVITY TIME NEEDED:** 20 MINUTES–4 WEEKS

### ACTIVITY:

Incubation of eggs is a fascinating experience if all goes well. On the other hand, poor results or total failure can be very frustrating. As with most biological processes, many abnormalities may occur during development of the bird embryo.

The term embryonic mortality is used to describe the death of an embryo during the incubation period. Mortality rates vary with each group of eggs incubated. Mortality can be caused by a variety of conditions. There are three critical periods during embryonic development of chicken eggs: (1) 0 to 4 days, (2) 5 to 17 days, and (3) 18 to 21 days.

During the **early embryonic** stage (0 to 4 days), causes of **mortality** may be:

- Eggs held too long—eggs should be set by seven to 10 days after laid for maximum hatchability.
- Eggs stored improperly—eggs should be stored in a clean area at 55° to 65°F and 70 to 80 percent relative humidity.
- Improper sanitizing of eggs.
- Exposure to toxic substances during cooling and storage.
- Rough handling—handle eggs gently to prevent shell breakage and ruptured air cells.
- Egg-borne diseases in breeding flock—certain diseases can pass from the infected hen to the egg during egg formation. Example: *Salmonella pullorum*-typhoid.
- Severe nutritional deficiencies (particularly vitamins)—The embryo's only food supply during incubation comes from the nutrients in the egg. If the hen's ration is inadequate, there will not be enough nutrients in the egg for proper nourishment of the embryo.
- Improper temperature, humidity, ventilation and turning.

### Leader Notes

Have each member incubate a certain number of eggs. Have each member document the environmental conditions and figure embryonic mortality and the suspected reasons.

If incubation is not possible, set up a skillathon by listing certain conditions to see if members could detect causes of embryonic mortality.

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## Leader Notes

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**Middle mortality** (5 to 17 days) causes may be:

- Nutritional deficiencies
- Bacterial contamination
- Improper temperature, humidity, ventilation and turning.

**Late mortality** (18 to 21 days) causes may be:

- Marginal nutrition
- Contamination
- Improper turning
- Improper temperature, humidity and ventilation
- Old eggs

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. If you hatched some eggs, what were the major causes of embryonic mortality? In which period did the deaths occur? Why?
2. If you did a skillathon, what situation did you study? Why?

#### **Process:**

3. What are the three critical periods during chick embryo development?
4. What management practices prevent chick embryonic mortality?

#### **Generalize:**

5. What stages of embryonic development are most critical in other farm animals? Why?

#### **Apply:**

6. How can the study of embryonic development help you make appropriate decisions for healthy and efficient production?

### REFERENCES:

#### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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# General Hatchery Management Practices

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Pre- and post-hatch functions of an efficient hatchery
- Stages of embryonic development
- Important record keeping information for hatcheries

#### **ABOUT THEMSELVES:**

- Their interest in business management
- Their feelings about the value of business records

### Materials Needed:

- Member Handout 4, Embryonic Mortality and Development Stages
- Member Activity Sheet 3, Hatchery Record Sheet

**ACTIVITY TIME NEEDED:** 30 MINUTES

### ACTIVITY:

### Leader Notes

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Today's U.S. poultry industry consists of a number of highly specialized support industries. One such industry is the hatchery industry. This industry converts fertile hatching eggs into day-old poultry using artificial setting hens called incubators.

Because of its place in the production/marketing chain, the hatchery industry has contributed much to the rapid development of the poultry industry. In addition to using the hatchery as a source of improved breeding stock and the source of day-old birds, many poultry people look to the hatchery for information about disease control, nutrition and management, and as a supplier of medication and equipment.

A hatchery is a manufacturing unit. Its raw product is the hatching egg, its manufacturing process is the incubation of eggs, and its finished product is day-old poultry. Whether or not a hatchery is successful depends largely on the number of eggs that produce saleable birds. This is called **hatchability**. Factors that influence hatchability are fertility, health and nutritional level of the breeders, care and handling of the eggs, environmental conditions during incubation and sanitation in the hatchery.

Many processes are involved, from receiving the hatching eggs at the hatchery to delivery of the day-old birds to the grower.

**CLEANING THE EGGS.** Most hatcheries wash or dry clean, and in some cases fumigate, all hatching eggs upon arrival from the farm.

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## Leader Notes

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**STORAGE OF EGGS.** After cleaning, the eggs are held in egg coolers at a temperature of 60° to 65°F and a relative humidity of 70 to 80 percent. The eggs are moved into the incubator room several hours prior to setting to warm the eggs up to room temperature (70° to 75°F).

**INCUBATION.** Incubators are of two general types: (1) small, still-air type, in which ventilation is provided by natural air movement, and (2) forced-draft incubators, in which air movement is provided by electric fans. The latter type varies from cabinet incubators that hold several thousand eggs to room-size incubators that hold many thousands of eggs. In these machines, temperature, humidity, ventilation and turning are controlled by automatic controls. The following are general recommendations for chicken eggs incubated in a forced-draft incubator.

	Stage of Development	
	<u>1 to 18 days</u>	<u>18 to 21 days</u>
Temperature	99°–100°F	97°–98°F
Humidity		
Relative humidity	60%	75%
Wet bulb temperature	84°–86°F	88°–90°F
Oxygen level	21%	21%
Carbon dioxide level	.5%	.5%
Turning	3–8 times	Not necessary

Have members set 20 to 24 eggs in a small incubator and determine the fertility, hatchability and moisture loss of the eggs using Activity Sheet 3, Hatchery Record Sheet. Moisture loss is a good indication of the proper relative humidity of the incubator. For example, chicken eggs should lose approximately 12 percent of their weight during incubation. Using the “Guidelines for Determining Age of Embryonic Mortality” portion of the Embryonic Mortality and Development Stages handout, have members determine the approximate age at which the embryos died and the presence of abnormal embryos.

**TROUBLE SHOOTING.** Incubation is a very critical biological process. If the eggs are of poor quality or haven’t been handled properly, or if the incubators are not functioning properly, excess embryonic mortality, deformed chicks, etc., can occur. To prevent these conditions or to determine their probable cause, hatchery managers keep accurate records of incubator temperature and humidity, fertility and hatchability. A useful tool in determining what caused excess embryonic mortality is to break out the unhatched eggs and determine the approximate age at which the embryos died and the presence of abnormal embryos.

**GRADING.** This involves removing those birds that are weak, deformed or have unhealed navels. Concurrent with grading, the birds are counted and placed in boxes for delivery to the producer.

**MISCELLANEOUS PRACTICES.** In addition to incubating hatching eggs, hatcheries perform other services related to preparing the birds for delivery to the producer. Many of these services are done at the hatchery because of the ease of handling small birds. Hatcheries usually charge a small fee for each of these services. Examples of these services are:

**Beak trimming.** This procedure is done to prevent cannibalism. Because of their short life cycles and ease of handling, broiler chicks and turkey poults are usually beak-trimmed prior to leaving the hatchery.

**Declawing.** This procedure involves the surgical removal of the tips of the two to three toes to prevent scratching of penmates; particularly among cage layers and breeding males.

**Desnooding.** This procedure involves the removal of the snoods on day-old male turkeys using nail clippers or small scissors. It is done to reduce injury from fighting.

**Dewinging.** This procedure is done to permanently prevent flight. It is done by either severing the outer tendon on one wing or by removal of the wing tip on one wing with a hot wire or blade.

**Dubbing.** This is the surgical removal of the combs of chicks. Dubbing reduces injury from fighting. It is primarily done on potential breeding cockerels and game fowl.

**Injections.** It is a common practice to inject poults with an antibiotic and electrolyte solution before they leave the hatchery to reduce the effects of stress.

**Sexing.** If the customer wants the sexes separated, the chicks or poults are sexed soon after hatching by either the autosexing or vent sexing methods. This is a common practice in egg-type chickens, because the cockerels have little value, and in turkeys because males and females have different nutritional requirements as they grow.

**Vaccination.** In some cases, birds are vaccinated for specific diseases before they leave the hatchery.

**Wingbanding.** Chicks and poults are sometimes wingbanded before they leave the hatchery when individual bird identity is needed, e.g., breeding stocks.

Visit a hatchery to see how many of the additional services are provided. Discuss the need and economics of each service.

### DIALOGUE FOR CRITICAL THINKING

#### Share:

1. What was your first impression of hatchery management?
2. How successful were you in hatching your eggs? Why? Why not?

#### Process:

3. What are the factors affecting hatchability?
4. What is the biggest problem when operating a hatchery? Why?

#### Generalize:

5. What business concepts did you observe that would be similar to other business?
6. What is the significance of record keeping in a business?

#### Apply:

7. What principles did you learn that will help you in the future?
8. What is the potential for hatchery management as a career? Why?

### **GOING FURTHER:**

- Study the potential for future broiler production in your area.
- Give a presentation about the services provided by a hatchery.
- Discuss consumer demand for poultry meat past, present and future.

### **REFERENCES:**

*Poultry Science Manual*, Department of Animal Sciences and Industry,  
Kansas State University

### **Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed By:**

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# GENERAL HATCHERY MANAGEMENT PRACTICES

## POULTRY, LEVEL III

### Member Handout 4, Embryonic Mortality and Development Stages

#### Guidelines for Determining Age of Embryonic Mortality

##### I. Normal Distribution of Embryonic Mortality

Early (0 to 4 days)	- 2 to 3%
Middle (5 to 17 days)	- 1%
Late (18 to 21 days)	- 3 to 4%

##### II. Breakout Guidelines—Use the stages in Development of the Chicken Embryo (below) to classify the approximate age at which each embryo died.

- A. Early Mortality (0 to 4 days)—**No visible blood**, 0 to 36 hours, can be either embryos that died prior to placement in incubator or those that died prior to appearance of blood islands. Early dead germs are hard to distinguish from infertile eggs by candling. An infertile egg's germ spot appears as an undefined area when broken out while that of a fertile egg appears as a donut-shaped ring. **Blood islands present**, 36 to 48 hours.
- B. Middle Mortality (5 to 17 days). Feathers appear on the embryo's body by the 11th day. By the 14th day, all parts are in place.
- C. Late Mortality (18 to 21 days). During this period, the embryo gets into position for hatching and pips the air cell in the large end of the egg by the 20th day.

#### Stages in Development of the Chicken Embryo

- Day 1 Blastoderm appears as a donut-shaped ring; infertile germinal disc appears as an undefined area.
- 2 Appearance of blood islets; formation of heart which starts to beat at about the 30th hour.
- 3 Vascular system well developed; leg and wing buds begin as swelling of approximately equal size.
- 5 Distinct eye development; demarcation of three distinct toes.
- 6 Beak being formed, no egg tooth on beak.
- 7 Egg tooth visible, distinct feather papilla on thigh.
- 8 Feet and wings well developed.
- 9 Feather follicles on all feather tracts; large egg tooth.
- 10 Wing finger and toes distinct; down feathers in tail; flight feathers conspicuous; comb appears as prominent ridge with slightly serrated edge.
- 11 Comb prominent and clearly serrated.
- 12 Down feathers on body and over eyes.
- 13 Appearance of wattles and prominent comb; beak hardened up to egg tooth.
- 12–16 Increase in size and feathering; claws and beak become firm.
- 17 Normal hatching position (head under right wing, pointed toward air cell).
- 18 Albumen gone; yolk absorption beginning.
- 19 Absorption of allantoic fluid completed; yolk sac about half enclosed in body cavity; beak pierces air sac.
- 20 Yolk sac completely absorbed; navel closing over; inner shell membrane pierced; pipping begins.
- 20–21 Hatching; usually takes 10 to 20 hours

*Adapted from Lillie's Development of the Chick, revised by Howard L. Hamilton, 3rd edition, 1952. Published by Henry Hold and Co., New York and Adapted from J.M. Moulding, unpublished manuscript.*

**GENERAL HATCHERY MANAGEMENT PRACTICES**  
**POULTRY, LEVEL III**  
**Activity Sheet 3, Hatchery Record Sheet**

Source of Eggs \_\_\_\_\_

Date Eggs Set \_\_\_\_\_

No. Eggs Set	Bulk Weight		No. Infertiles	No. Dead Germs			No. Chicks Hatched
	Start	End		0-4d	5-17d	18-21d	

When a lot of eggs are set, indicate the number set, their bulk weight prior to placing in the incubator. Then bulk weight the eggs at 7 or 14 days of age and calculate the percent moisture loss using the formula below. Also, at this time record the number of infertile eggs. To further differentiate between apparent and true infertiles, break out the candled infertiles and record number of true infertiles and early dead germs using Member Handout, Guidelines for Determining Age of Embryonic Mortality. Also use this guideline to record the approximate age.

**Summary:**

Percent hatch of all eggs set \_\_\_\_\_

Percent hatch of fertile eggs \_\_\_\_\_

Percent dead germs \_\_\_\_\_

**Percent weight loss:**

1. (day 0 bulk weight \_\_\_\_\_ minus day \_\_\_\_ bulk weight)  $\times$  100 = \_\_\_\_\_ percent weight loss
2. Average daily moisture loss: Percent weight loss from (1) \_\_\_\_ divided by days eggs were incubated = \_\_\_\_\_ percent moisture loss per day.
3. Projected 21-day loss of moisture: Average daily moisture loss \_\_\_\_ (2)  $\times$  21 = projected moisture loss.

**Think Back:**

What are the main concerns of the hatchery industry?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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# The Chicks are Here

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- How to care for newly hatched chicks
- Basic housing and equipment needs of newly hatched chicks
- Five common problems that might arise with new chicks

#### ABOUT THEMSELVES:

- Their feelings about preparation for an event or activity within the family

### Materials Needed:

- Member Handout 5, Brooder Layout for Equipment Set-up
- Chalkboard or newsprint

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

To successfully raise a small flock of chickens, you must meet certain floor space, heating, brooding, ventilation, lighting and equipment needs. Today, we will identify and discuss these needs.

The ideal time to brood chicks is during the spring months as the days become warmer. But before the chicks arrive, you should consider these things:

1. Is the housing and equipment in good condition?
2. Is the housing and equipment cleaned and disinfected?
3. Have you put fresh litter down?
4. Is the equipment (brooder, waterers and brooder guard) in its proper place?
5. Is the brooder stove operating properly?
6. Are feed and water in place?
7. Is the housing and equipment adequate?

**Brooding** is a term used to describe the care of young poultry from the time of hatching or from the time received from the hatchery until they no longer need supplementary heat. This is the most important phase of the chick's life.

Unlike newborn mammals that require feed and care from the mother, newly hatched chicks may go for up to three days without feed or water (except that which comes from the yolk). But the sooner they are given food and water, the better the chance for survival.

### Leader Notes

Ask members what preparations need to be completed before newly hatched chicks arrive. Write their responses on a large piece of paper or chalkboard. Have each member prepare a checklist of things to do to prepare. Compile member lists before discussing or telling.

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## Leader Notes

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Show example of brooder. Distribute Member Handout 5, Brooder Layout for Equipment Set-up, and have members follow along as you describe the setup.

For small flocks, brooding can be done with an electric or gas brooder or infrared lamp. Infrared lamps will help prevent pecking. For very small flocks, two 100- or 150-watt incandescent light bulbs are sufficient during warm weather. Always use two bulbs so if one burns out, the chicks still have heat.

Place chicks under the brooder as soon as they arrive and check frequently. Hang the bulbs low enough so the chicks get all the heat they need, but not so low that you risk setting the litter on fire. The chick pattern around the heat source tells you if it's at the correct height and setting. If too warm, the chicks will pant and stay as far away as they can. If too cold, they will huddle under the heat source, and the crowded conditions may cause the chicks to smother each other.

Set the brooder temperature at 90° to 95°F for day-old chicks and reduce 5°F weekly until 70°F is reached. The room temperature should be maintained at a minimum of 65°F.

Circle a barrier around the heat source to prevent chicks from wandering away from the heat and to block any floor drafts. The barrier should be 1½ feet high and from 5 to 7 feet in diameter. Corrugated cardboard will do. The ring can be removed after one week. But before doing that, tack a screen or chicken wire across each corner of the brooder room so the chicks can't bunch or pile up there.

### **FLOOR SPACE**

Adequate space needs to be provided. The minimum space requirements for baby chicks is  $\frac{3}{4}$  square foot per chick.

### **VENTILATION**

A poultry house should be ventilated to take in fresh air and exhaust stale air. Air vents should be designed so drafts will not blow directly on the birds.

### **LITTER**

Litter should be 2 to 4 inches deep and of a material that is free of molds, has the ability to absorb moisture and doesn't compact or cake. Good examples include wheat straw, ground corn cobs, soft wood shavings and dry sawdust. For chicks, place a 3- to 4-inch layer of new litter on the brooder house floor. Remove droppings and damp litter to prevent offensive odors and disease organisms. Build up litter by adding new litter to top of the old as needed.

### **FEEDERS**

Start baby chicks on feed by placing some starter ration in a small feeder and some on an egg flat, piece of cardboard, newspaper, or old towel right next to the feeder. Put only a handful or two on the flat at one time. After about four days, use just the small feeder; and as soon as possible, switch to a larger feeder.

Two of the non-automatic feeders commonly used in small-flock operations are the trough type and the hanging-tube type. Although both work very well, there is usually less feed loss and the feed stays drier and cleaner with the hanging type.

Plan on at least 1 inch of feeder space per chick through 4 weeks of age. In other words, one 4-foot feeder open on both sides is adequate for 100 chicks. However, to ensure good pen distribution, two feeders would be better. After 4 weeks of age, provide at least 2 to 3 inches of feeder space per bird.

For the first four to six weeks, feed a starting mash. The type of starter mash you'll need will depend on whether you're feeding egg, dual-purpose, exhibition or broiler chicks. At six weeks, replace the starting mash with a growing mash and scratch grain for birds destined for the laying pen. The starting mash should be replaced with a finisher ration for broilers at five weeks of age.

### **WATERERS**

Chickens need fresh, clean water available to them at all times. Start your chicks on small gravity-fed water fountains, after two weeks gradually switch to automatic waterers if you have them. To do this, put the fountains (with feeders between them) around the brooders before the chicks arrive. Each day, move the fountains toward the automatic waterers, and eventually begin removing them. Do not let the fountains go dry, even though the automatic units are being used.

There are several types of automatic waterers on the market, including nipple, cup and trough drinkers; all do a good job. If non-automatic fountains are used, they should be set on a wire platform about 2 to 3 inches off the floor to keep both water out of the litter and litter out of the water.

Plan on two 1-gallon size gravity-fed fountains for each 100 chicks up to 4 weeks of age. If you will not be using automatic waterers, add a third fountain per 100 birds after the fourth week.

### **LIGHTING**

Although not essential, artificial lighting is recommended during the first three weeks of the brooding period. A common 10- to 15-watt night light lets the chicks find feed and water at all times and helps keep them from becoming frightened. Since baby chicks will be attracted to the light, locate it near the heat source.

### **SANITATION**

Good sanitation is a must in all phases of poultry production to ensure top bird performance and to prevent the development and spread of disease. Sanitation practices are needed before a new batch of birds arrives and every day thereafter.

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## Leader Notes

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Have members rank a list of needs for newly hatched chicks. Let them defend their list of priorities with other members.

Diseases are usually transmitted to younger birds from the older ones. So, if you have flocks of different ages, raise them separately and always check on the youngest flock first. Have a shallow pan of disinfectant to walk through when entering the poultry house, and clean any manure from boots or shoes when leaving the building. Change the disinfectant at least once a week. If possible, keep visitors out of your facility, especially those who have poultry flocks, or who have been to other flocks.

If you follow these guidelines, you should be successful in raising your chicks; however, you should watch for these common problems:

### SEVEN COMMON MANAGEMENT PROBLEMS:

1. **Cannibalism**

Cannibalism is the vicious habit of one bird picking the feathers, toes or vents of another. It may start because of overcrowding, overheating, inadequate nutrition, excessive light, inadequate feeder space, and mixing strange birds. Beak trimming is the most effective preventative measure.

2. **Starve outs**

Birds that die from failure to eat and drink are called starve outs. Contributing factors are inadequate feeder space, poor lighting and delayed placement of chicks after hatching. Death from starvation usually starts at 4 to 5 days of age.

3. **Piling**

Insufficient heat or fright may cause the chicks to pile in corners, and leads to death from smothering.

4. **Wet litter**

Main causes of wet litter are poor ventilation, excessive water spillage and high manure moisture content due to excess salt intake from water and/or feed.

5. **Feed wastage**

Usually, feed wastage results from improper feeder design or adjustment, or filling the feeders too full.

6. **Poor feathering**

Common causes of poor feathering are excessive brooder temperatures, insufficient amino acid levels in feed or birds have a genetic trait for slow feathering.

7. **Breast Blisters**

This condition results from physical irritation of the tissue covering the keel bone of the fowl. Any factor that contributes to increasing irritation of the keel bone has the potential to increase the incidence of breast blisters. Common causes of breast blisters are wet, packed litter, poor feathering and any disease condition that causes the birds to spend abnormal time resting on their breasts. Breast blisters are most common in male broilers and turkeys.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**

1. What are the major steps to prepare for receiving newly hatched chicks?
2. Which step do you think is the most important? Why?

**Process:**

3. What is the most important factor when brooding chicks? Why?
4. What common management problems might occur when raising newly hatched chicks?

**Generalize:**

5. How are baby chicks different from other newborns?
6. How important is preparation for major events? Why?

**Apply:**

7. How can you be prepared for future events in your life?
8. What effect does planning have on preparedness?

**GOING FURTHER:**

- Design a brooder facility for newly hatched chicks.
- Prepare and present a talk on taking care of newly hatched chicks to a 4-H group or school class.
- Compare a brooder facility to newborn facilities of other animals.
- Visit a commercial hatchery.

**REFERENCES:**

*Raising Chickens for 4-H*, Purdue University  
*Management of the Small Flock of Chickens*, C-508, K-State Research & Extension

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## Leader Notes

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**Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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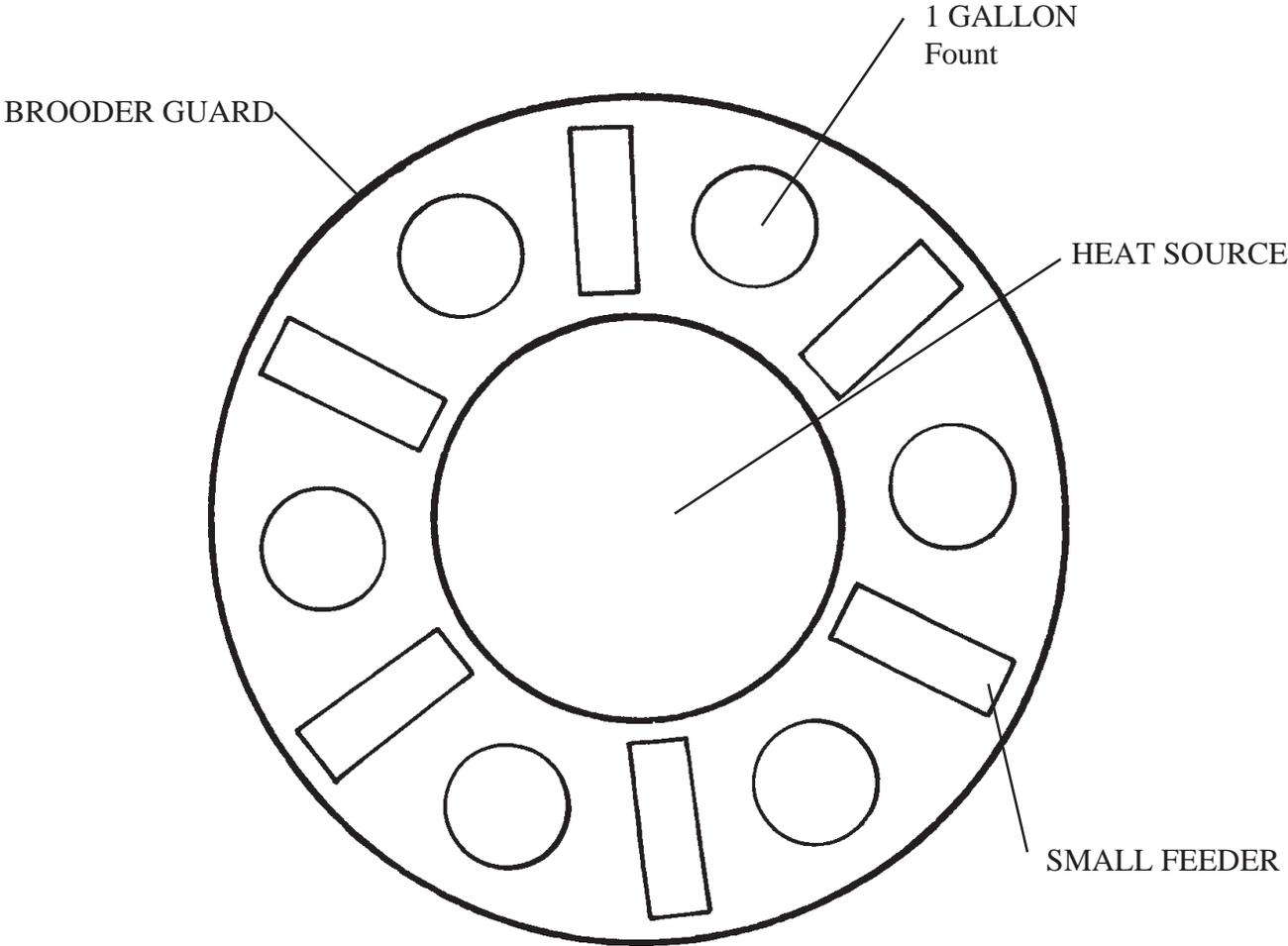
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**THE CHICKS ARE HERE**  
**POULTRY, LEVEL III**  
**Member Handout 5, Brooder Layout for Equipment Set-up**







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# Basic Nutritional Needs of Poultry

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The importance of protein in a chick ration
- The importance of a balanced ration
- The basic functions of the six nutrient classes

#### **ABOUT THEMSELVES:**

- The importance of protein in their diet
- Symptoms of humans when basic nutrient needs are not met in their diet
- Their feelings about famine in the world

#### **Materials Needed:**

- Facilities to rear two groups of 10 chicks each
- Scales
- 22 percent protein ration
- 18 percent protein ration
- Member Handout 6, Chick Weigh Sheet and Nutrient Functions

#### **ACTIVITY TIME NEEDED: 7 WEEKS**

#### **ACTIVITY:**

#### **Leader Notes**

All animals need a balanced diet to grow and develop. The diet must contain the proper amount of all nutrients or the animal will not grow to normal weight and size.

The following activity will demonstrate what happens when one of the six nutrient classes is not at its proper level.

Obtain 20 1-day-old broiler chicks and divide them into two groups of 10. Weigh the birds in each group and record their weights on the weigh sheet. Feed one group a standard broiler starter containing 22 percent protein. Feed the other group a starter containing 18 percent protein. Both rations should be the same except for the protein levels. At 4 weeks of age weigh the birds, record and compare the weights of the two groups. For the next three weeks feed both groups the 22 percent protein ration. Again weigh the birds, record and compare the weights.

On the weigh sheet list the six nutrient classes from Identifying Poultry Feed Ingredients (Level II) and give a function of that nutrient class. Discuss these functions with a friend or your leader.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What differences did/would you expect to see in chicks fed two different protein levels? Why?
2. How did expectations compare to actual observations?

#### **Process:**

3. What problems occurred when conducting the experiment? Why?
4. What happened to the 18 percent ration birds after they were switched to the 22 percent ration?

#### **Generalize:**

5. How do you think a shortage of protein in your diet would affect you?
6. What symptoms do malnourished children have?

#### **Apply:**

7. What can you do to help prevent famine in the world?
8. What do you think are the major causes of famine?

### **GOING FURTHER:**

- Study the affects a lack of some of the other nutrients would cause on young chicks.
- Give a talk to your class or club on the results of your experiment.
- Balance a poultry ration using your own ingredients.

### REFERENCES:

#### Author:

John Struwe, Extension Assistant, University of Nebraska; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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## BASIC NUTRITIONAL NEEDS OF POULTRY

### POULTRY, LEVEL III

#### Member Handout 6, Chick Weigh Sheet and Nutrient Functions

Nutrient Class	Functions
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

#### Chick Body Weights

_____ day(s) old	4 weeks		7 weeks		
22% Protein	18% Protein	22% Protein	18% Protein	22% Protein	18% Protein
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____



# Controlling Body Weight of Replacement Birds

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Five reasons for controlling body weight in replacement birds
- Three methods used to control bird weight

#### **ABOUT THEMSELVES:**

- The importance of proper body weight
- Proper weight control methods available to use

#### **Materials Needed:**

- Pencil
- Calculator (optional)
- Activity Sheet 4, 18 Week Body Weights
- Activity Sheet 5, Flock Body Weight Calculation Form

#### **ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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When birds are raised as breeder replacements or as layer replacements, their weight must be controlled during the growing period.

Birds are grown to meet their particular industry standard, which will vary from breed to breed or strain to strain. Most of the reasons for controlling weight are the same, regardless of breed. The correct weight has several advantages, one of which is a more uniform flock. These uniform flocks will give larger first eggs and an increase in egg production over their life cycle. Breeder flocks that are uniform will have eggs with increased fertility and hatchability. These flocks will have lower feed costs and reduced mortality during their production cycle. Heavy or light birds will not keep pace with the average weight bird.

A bird's weight can be controlled during the growing period by several different methods. (1) The nutrients in the diet can be adjusted up or down according to the needs of the birds. (2) Energy level of the diet (the amount of fat and carbohydrates) can be reduced. (3) Bulk (such as oats) or fiber (non-digestible carbohydrate) can be added to the diet to reduce the concentration of nutrients which will slow a bird's development.

Another method for controlling body weight is to restrict the amount of time that birds have to eat. This can be done by limiting the amount of time the lights are on, or by giving the birds a measured amount of feed each day, which is less than they would eat if full-fed. The birds could also be fed twice the normal limited feeding amount on an every-other-

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## Leader Notes

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day basis. If the bird is underweight, you reverse these procedures to help it grow faster.

It would require a project lasting several months to demonstrate the effect of weight on the productivity of live birds. Pullets must be grown to 18 to 19 weeks of age before egg production starts, and production records would need to be recorded for at least another 12 months to determine the effects of body weight on performance. An alternative is to calculate the uniformity of body weight and average body weight for a flock from simulated weights.

Handout Activity Sheet 4, 18 Week Body Weights, for a flock of egg-type pullets, and Activity Sheet 5, Flock Body Weight Calculation Form. Have the youth calculate the average body weight and uniformity of body weight for the flock.

Management becomes more important when a bird's feed intake is restricted. For example, if feeder space is inadequate, the more aggressive birds will eat first, resulting in less feed for the timid birds.

Most breeders recommend for good performance, 75 to 80 percent of the birds should weigh within plus or minus 10 percent of the average weight of the flock.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What did you learn from the simulated flock weight calculations? Why?
2. What was the most difficult concept to understand in the flock weight scenario? Why?

#### **Process:**

3. Why do producers want to control body weight in replacement birds?
4. What is significant about the range above and below average weight? Why do you think that 10 percent is the standard?

#### **Generalize:**

5. What did you learn about yourself by doing this activity? Why?
6. How does proper growth rate affect mature weight in humans?

#### **Apply:**

7. How will issues raised by this activity and discussion be useful to you in the future? Why?
8. What will you do differently in the future as a result of this lesson? Why?

Point out to the youth that a flock can have the correct average weight but lack uniformity of weight. Encourage cooperative learning by letting small groups do the activity together.

### GOING FURTHER:

- Invite a doctor or other professional to discuss youth weight control with your group.
- Study and analyze commercial diet programs.
- Review and discuss weight, height and frame tables for humans.

### REFERENCES:

#### Author:

John Struwe, Extension Assistant, University of Nebraska; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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## CONTROLLING BODY WEIGHT OF REPLACEMENT BIRDS

### POULTRY, LEVEL III

#### Activity Sheet 4, 18 Week Body Weights

18 Week Body Weights (gm) of 80 Egg-type Pullets

1400	990	850	895	1100
900	1450	1150	1200	1000
750	1100	950	1500	1550
850	930	1050	1300	800
800	1010	1460	960	1590
950	950	1010	1425	1060
790	810	1060	940	1020
1470	1490	1140	870	740
850	890	1220	1410	1610
920	1520	1160	1280	740
980	770	1340	1240	790
1530	890	1310	1550	1000
1350	1280	780	1450	870
960	780	1100	950	740
990	1240	1510	1160	1310
840	840	1060	1260	1520

Using the body weights above and the “Flock Body Weight Calculation Form,” calculate:

1. The average weight per bird
2. Uniformity of weight (%)
3. Ideal weight range
4. Percentage of birds within plus or minus 10% of average bird weight

Procedure:

1. Put a checkmark in a box opposite the appropriate weight range on the “Flock Body Weight Calculation Form” for each bird weight in the list. Example: 1400 would be opposite 1400–1449.
2. Count the number of checkmarks for each weight range and put the total in the “No.” column.
3. Multiply the “No.” column times the “Avg. wt.” column to get total weight of birds in that weight range.
4. Record the total birds weighed and the total weight in the appropriate boxes at the bottom of each column.
5. Calculate:

$$\text{Avg. wt. per bird} = \frac{\text{total weight}}{\text{total birds weighed}}$$

$$\text{Uniformity of weight} = (\text{avg. wt. per bird}) \times (10\%)$$

$$\text{Ideal weight range} = (\text{avg. wt. per bird}) - (\text{uniformity}) \text{ to } (\text{avg. wt. per bird}) + (\text{uniformity})$$

6. Count the number of birds that weigh within the ideal range.
7. Calculate the percentage of birds that weighed within plus or minus 10% of the body weight of the average bird in the flock:

$$\% \text{ birds within plus or minus 10\% of avg. wt.} = \frac{\text{number birds within ideal wt. range}}{\text{total number of birds weighed}}$$

**CONTROLLING BODY WEIGHT OF REPLACEMENT BIRDS**  
**POULTRY, LEVEL III**  
**Activity Sheet 5, Flock Body Weight Calculation Form**

Weight Ranges (grams)											No.	Avg. wt.	Total wt.
0700-0749												0725	
0750-0799												0775	
0800-0849												0825	
0850-0899												0875	
0900-0949												0925	
0950-0999												0975	
1000-1049												1025	
1050-1099												1075	
1100-1149												1125	
1150-1199												1175	
1200-1249												1225	
1250-1299												1275	
1300-1349												1325	
1350-1399												1375	
1400-1449												1425	
1450-1499												1475	
1500-1549												1525	
1550-1599												1575	
1600-1649												1625	
1650-1699												1675	
<b>Total Birds Weighed</b>													
<b>Total Weight</b>													

Ideal weight range = \_\_\_\_\_ grams  
Average weight per bird = \_\_\_\_\_ grams  
Uniformity of weight = \_\_\_\_\_ %

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**Think Back:**

What are the main concerns when raising poultry?

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# The Comforts of Home

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Major poultry housing improvements developed by man
- Why environmental control is important to commercial poultry producers

#### **ABOUT THEMSELVES:**

- The importance of environmental control
- The effect of the environment on performance at school, work

#### **Materials Needed:**

- Large sheet of paper
- Pencils or marking pens

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

Just as people have improved their own living environment, they have also made changes in the environment of the birds they raise. The improvements made in the quality of poultry housing has enabled the producer to be more efficient and continue to provide a comfortable living environment for the birds.

Years ago, nearly all chickens were raised outside. They were brooded indoors; but within a few weeks they were let loose to run in the yard, fenced or not. Many small flocks are still raised this way.

The main advantages to raising chickens outdoors are fresh air and space to exercise. The birds can also find extra food, such as insects, worms, grass, clover and weeds.

However, the drawbacks of outdoor rearing often outweigh the advantages. One disadvantage is weather. Another disadvantage is a threat of predators, such as coyotes, foxes, skunks, raccoons and owls. Parasite infestation is also more common, since internal parasites are usually present in the soil in a natural environment.

Today, most commercial poultry producers raise their birds under semi-controlled environments. Layers, broilers and pullets can be handled more efficiently when the heat, ventilation, light, feed and water are all controlled. Most tasks are done by automatic equipment, even egg gathering. Except for broilers and turkeys, the birds are usually kept in cages, each having a small but adequate amount of space.

#### **Leader Notes**

Have members list some of the changes or inventions that have been made in housing for people during the last 100 years. List their comments on a large sheet of paper or chalkboard.

Have members list environmental changes in poultry housing and the reasons for each.

Compare and discuss the human housing changes with those for poultry.

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## Leader Notes

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A semi-controlled environment does not mean that all problems are eliminated. In fact, when a problem does occur, it must be dealt with quickly because there are so many birds in a concentrated area. A semi-controlled environment does mean, however, that a large number of birds can be cared for by very few people.

Environmentally-improved buildings provide for the ultimate in bird comfort, health and efficiency of feed utilization. They lend themselves to automation, which results in labor efficiency.

Since the optimum temperature for layers is 55° to 80°F and for broilers, 75°F, insulation and environmental temperature controls have been added to provide a more comfortable environment in which the birds can live and produce—cooler houses in the summer and warmer houses in the winter. Insulation has also resulted in energy conservation.

Artificial light was first used in the 1900s to stimulate egg production by providing a longer workday for the bird. Now it is known that controlled lighting has a physiological effect on production. Light enters the eye of the bird and stimulates the pituitary gland, which releases certain hormones that stimulate egg production. Artificial light has become very important in increasing egg and meat production.

Mechanical or a combination of natural and mechanical ventilation is used in most commercial poultry houses. Proper ventilation keeps moisture, odor, and dust levels to a minimum, resulting in maximum productivity, plus bird and caretaker well-being.

Poultry producers have also added automated equipment to eliminate most hand labor chores such as feeding, watering, egg gathering and cleaning. Self-feeders, feed augers and belts, labor-saving processing equipment, automatic waterers and manure disposal units are just a few of the automated devices that have been developed and put to use. Automatic feeders also help to keep feed fresh and cut down on waste.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What environmental poultry housing changes did you list? Why?
2. Which housing change do you think was the most significant? Why?

#### **Process:**

3. What are the advantages and disadvantages of raising birds outdoors?
4. Why are most birds raised in semi-controlled environments today?

**Generalize:**

5. How do you feel about controlling the environment in your house?
6. What environmental controls in your home are made for economic reasons? Comfort reasons? Why?

**Apply:**

7. Why is a semi-controlled environment important at school or in the workplace?

**GOING FURTHER:**

- Visit a commercial poultry farm and make a list of automatic equipment that is used.
- Examine a poultry magazine and compile a list of new poultry automation equipment and housing facilities being developed.
- Prepare a talk on improving the environment for domesticated animals or birds.

**REFERENCES:**

*Poultry Science*, Ensminger.

**Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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# Light Sensitivity in Chickens

*Poultry, Level III*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- The effects of light on reproduction and growth in poultry
- The formula used to grow chicks that are hatched during fall or winter

### ABOUT THEMSELVES:

- How light affects human behavior
- How they feel about regulating light via daylight-saving time

### Materials Needed:

- Member Handout 7, Hypothalamus-Pituitary Relationship
- Activity Sheet 6, Lighting Problems

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

For many years it has been a common practice for poultry producers to supplement natural daylight with artificial light in the laying house. It was once thought that the favorable effect of artificial light was gained by providing more feeding time for the hens. Now we know that light striking the head of the chicken stimulates the hypothalamus gland, which, in turn, stimulates the pituitary gland. The pituitary gland releases hormones, which regulate body processes that affect growth, sexual maturity, egg production and molting.

The main factors that influence the degree of stimulation during the growing and laying periods are: (1) whether the amount of daylight is increasing or decreasing, (2) total daily light, (3) light intensity and (4) color of light. Increasing daylight has a stimulatory effect and decreasing daylight has a depressing effect. There are two important rules to observe in all lighting programs. They are:

1. Never increase daylight on growing pullets after 6 to 8 weeks of age because it speeds up sexual maturity (age at first egg) resulting in reduced egg size.
2. Never decrease daylight on hens during the laying cycle because it depresses egg production.

### LIGHTING SYSTEMS

**For Pullets.** The type of house in which the pullets are grown and their hatch date determine the lighting program. The hatch date of pullets

### Leader Notes

Distribute Member Handout 7, Hypothalamus-Pituitary Relationship. Review and discuss as a group.

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## Leader Notes

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reared in light-tight houses can be ignored. These birds should be grown on a constant amount of daylight, usually eight hours to sexual maturity. On the other hand, the hatch date of pullets reared in open-sided or windowed houses determines whether or not some type of light control is necessary during the growing period. Pullets hatched April 16 through August 15 need no supplementary light since they are growing during a period when natural daylight is decreasing, at least during the latter part of their growing period. Pullets hatched August 16 through April 15 are exposed to increasing daylight during at least the latter part of their growing period. These birds should be started on a long-light day with length reduced each week until sexual maturity.

**For Layers.** The minimum amount of light needed for stimulation of egg production is 11 to 12 hours of light, but 14 to 16 hours are needed for maximum egg production. Increasing light at sexual maturity can be done in one step or gradually. Using this plan, flocks reaching sexual maturity with less than 11 to 12 hours of daylight should have day length increased immediately to 11 to 12 hours, followed by weekly increases of 15 to 20 minutes until a day length of 14 to 16 hours is reached. At sexual maturity, pullets should have the amount of light gradually increased from 11 to 12 to 14 to 16 hours.

**Breeder Flocks.** Breeding flocks will respond to light in the same manner as a flock used for commercial egg production. Males and females should be reared on an identical lighting program, since semen production is believed to respond in a similar manner to egg production.

**Formula for a Decreasing Daylength Program.** Determine the number of hours of daylight when the flock reaches an age of 18 weeks. Add seven hours to this figure. The total will be the number of hours of light the chicks are to receive the first week. Each week thereafter, reduce the day length by 20 minutes until the pullets reach sexual maturity.

Hand out Activity Sheet 6, Lighting Problems, for members to complete individually or as a group.

Light intensity and color of light also influence performance of poultry. The light intensity needed for maximum productivity varies between species. For example, layers need a lower light intensity than turkeys. Low light intensity is used in windowless houses to reduce cannibalism. Poultry are stimulated more by red than blue-green rays of the light spectrum. Blue light is sometimes used when catching chickens because it has a calming effect.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What did you learn about the effect of light on chickens?
2. What was the most difficult light-related concept to understand? Why?

**Process:**

3. What light factors influence the growing and laying periods of birds?
4. Why are lighting systems more important in poultry production today as opposed to outdoor production in the past?

**Generalize:**

5. What are some of the effects of light on human behavior?
6. How do you feel about the use of daylight-saving time?

**Apply:**

7. What effect does light have on businesses or public use areas?  
(Consider street lights, parking areas, etc.)

**GOING FURTHER:**

- Present a talk on the use of light to your 4-H group or school class.
- List uses of artificial light in other animal operations.
- Study the benefits of artificial light to your family.

**REFERENCES:****Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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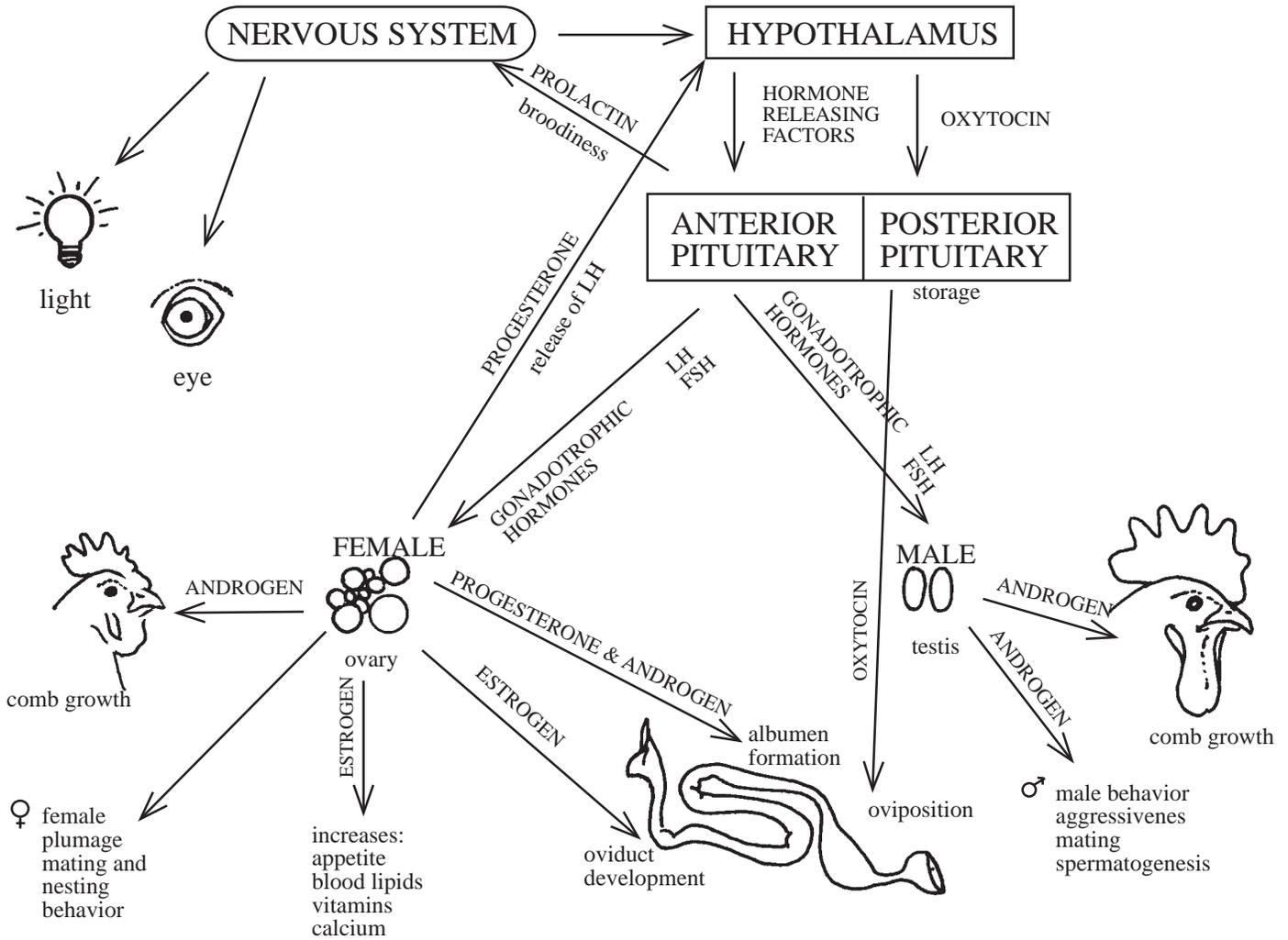
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**LIGHT SENSITIVITY IN CHICKENS**  
**POULTRY, LEVEL III**  
**Member Handout 7, Hypothalamus-Pituitary Relationship**



Relationship between the nervous system, endocrine glands and the reproductive system in male and female fowl.







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# Managing a Small Laying Flock

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Decisions that must be made before starting a small laying flock
- Costs involved in starting a small laying flock
- Records needed to figure production efficiency of small laying flock

#### **ABOUT THEMSELVES:**

- Their feelings about routines, habits and responsibilities
- Importance of planning, budgeting and record keeping

### Materials Needed:

- Building that is dry, well ventilated, and protected from extreme temperature (optional)
- Activity Sheet 7, Planning for a Small Laying Flock
- Activity Sheet 8, Small Laying Flock Budget
- Activity Sheet 9, Small Laying Flock Record

### ACTIVITY TIME NEEDED: 60 MINUTES

### ACTIVITY:

A small backyard flock of chickens can provide your family with a source of high quality food, added income, and can serve as an excellent learning experience. Remember though, a flock of chickens can restrict family activities since it must have daily feed, water and care.

Most farms and many suburban residences have facilities suitable for a flock of chickens. Before you start raising poultry, particularly in suburban areas, investigate local ordinances since some areas have restrictions on keeping poultry. Noise, dust, feathers, odors or flies from your flock can quickly cool neighborhood friendships. Good management and a visit with your neighbors explaining details of your project will go a long way toward preventing problems.

This lesson will help you make decisions about starting a small laying flock. Use Activity Sheet 7, Planning for a Small Laying Flock, as a decision-making guide.

Now let's consider planning for the costs and expected income of a small laying flock. You will need to consider some hen performance goals, investments in a building and equipment, plus income and variable expense projections. This budget will help you determine the feasibility of this project.

### Leader Notes

Give each member Activity Sheet 7, Planning for a Small Laying Flock. Divide the members into groups of two or three to discuss the planning sheet questions. Have each group report its findings for total group discussion.

Give each member Activity Sheet 8, Small Laying Flock Budget, to discuss in their small groups before reporting back to the entire group. You may want to give members the planning and budget sheets a week prior to this meeting to give them time to find some information from the local community.

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## Leader Notes

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Give each member planning to actually start a flock Activity Sheet 9, Small Laying Flock Record. Make plans for the members to visit the flock locations to observe and discuss their experiences. Compare actual records with budget proposals at the end of the year.

If you decide to actually start a small laying flock, you will need to keep accurate records to determine if you are within your projected budget and if you can produce enough eggs for your family needs and still sell enough to make a profit.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was your first reaction or thought when using the planning sheet questions for a small laying flock?
2. What was the most difficult item to plan for? Why?

#### **Process:**

3. How did you decide which breed or variety to purchase?
4. What type of building did you plan to use? Why?
5. Why is a budget and record keeping important for flock management?

#### **Generalize:**

6. What did you learn about routines, habits and responsibility?
7. What do you do daily to maintain your health and personal hygiene?

#### **Apply:**

8. What other things are you responsible for on a daily basis?
9. When do you think you will need planning, budgeting and record-keeping skills in the future? Why?

### **GOING FURTHER:**

- Discuss the advantages and disadvantages of dual-purpose versus egg-type breeds.
- Consider the possibilities of expanding a flock to supply eggs to a local restaurant, food market, etc.

**REFERENCES:**

*Management of the Small Flock of Chickens*, Circular 507, Kansas State University, (Revised) 1985

**Author:**

James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

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## **MANAGING A SMALL LAYING FLOCK**

### **POULTRY, LEVEL III**

#### **Activity Sheet 7, Planning for a Small Laying Flock**

Questions to Answer:

1. Will you purchase an egg-type or a dual-purpose breed?
2. What breeds of each type are available in your area?
3. Will you start the flock with day-old chicks or ready-to-lay pullets or hens? Consider price differences and facilities. If chicks, will they be straight-run or sexed?
4. How much housing space will you need for the number of birds in your flock?
5. Do you have space for an outdoor pen?
6. How many waterers and feeders will you need for the type and number of birds you are buying?
7. What type and number of nests will you need?
8. Will you use roosts? If so, how much space will be needed?
9. What type of litter will you use?
10. Will you use artificial lighting to maintain production? How much? How will you control?
11. What types of feeds and rations will be needed?
12. Where will you get your feed?
13. How will you control cannibalism?
14. Where will you store eggs?
15. How will you use or market the eggs?
16. What is your plan for fly, mite, louse and worm control?

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## MANAGING A SMALL LAYING FLOCK

### POULTRY, LEVEL III

#### Activity Sheet 8, Small Laying Flock Budget

Besides home consumption, the main outlet for eggs from a small flock is marketing direct to individuals, restaurants, institutions and stores which distributors can't economically serve. Also, some customers are willing to pay a premium for what they consider farm fresh or farm produced eggs and meat. However, you should carefully consider the problems involved before deciding to market direct. Be sure you have the facilities, the time, the salesmanship ability, a consistent supply of high quality eggs and the market outlets before entering direct marketing.

A. PERFORMANCE GOALS OF DUAL PURPOSE HENS:	Projections
Saleable eggs/hen housed-	20 dozens
Mortality-	12%
Grade A large eggs	70%
Grade A eggs	90%
Feed conversion	4.2 lb./dozen
Live weight of old hens	4.5 lb.
B. INVESTMENT:	
Building—use an existing shed	\$ _____
Equipment—used equipment	\$ _____
TOTAL	\$ _____
C. INCOME:	
Eggs-__ doz. × __c/doz × __ hens housed	\$ _____
Old hens-\$__ /hen × __hens	\$ _____
TOTAL	\$ _____
D. EXPENSES:	
Feed-__ doz/hen × __lb/doz × __\$/lb.	\$ _____
Variable costs (supplies, utilities, etc.)	\$ _____
Repairs-	\$ _____
Cost of chicks or hens	\$ _____
TOTAL	\$ _____
E. RETURN TO LABOR AND MANAGEMENT	\$ _____

Producers have a tendency to underprice their eggs and to not count all processing and marketing costs. Base your selling price to customers on a local market or nearby graded market. Add to this quoted price all processing and marketing costs above production costs, plus the amount of profit you expect to make. Processing and marketing costs are minimal if eggs are sold as gathered at your home, but add 10 to 15 cents per dozen if the eggs are washed, graded, cartoned and delivered to the customer. Also the cost of grade loss (not all eggs are Grade A large) must be taken into consideration. Insert your projected processing costs for the following items:

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## MANAGING A SMALL LAYING FLOCK

### POULTRY, LEVEL III

#### Activity Sheet 8, Small Laying Flock Budget, *continued*

Type of Cost	Cents per Dozen
Cartons	_____
Cases	_____
Delivery	_____
Equipment	_____
Other supplies	_____
Miscellaneous	_____
TOTAL	_____

Regulations. The Kansas Egg Law regulates the sale of eggs to consumers. A producer selling eggs of his/her own production direct to the consumer is exempt from the law. All other transactions fall under the law. Major provisions of the Law are: eggs must be Grade B quality or higher; the carton must plainly show the size, quality, and name of vendor, retailer or food purveyor and the inspection fee stamp. Information about the Kansas Egg Law can be obtained by contacting the Meat and Poultry Inspection Division, Kansas Department of Agriculture, 109 Kansas, 7th Floor, Topeka, KS 66612 (785-296-3511).

Adapted from *Is Poultry Production a Business for You*, K-State Research & Extension, MF-824, May 1986.

**MANAGING A SMALL LAYING FLOCK**  
**POULTRY, LEVEL III**  
**Activity Sheet 9, Small Laying Flock Record**

**FINANCIAL SUMMARY**  
**Project Income**

Date	Items Sold or Used at Home (Indicate Which)	Quantity	Amount
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
	• Ending Inventory (if appropriate)		\$ _____
	Total Project Income		\$ _____

**Project Costs**

Date	Items Bought, Used, Labor Costs, Value of Home-Grown Products	Quantity	Amount
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
_____	_____	_____	\$ _____
	• Beginning Inventory (if appropriate)		\$ _____
	Total Project Costs		\$ _____

**Summary**

Total Project Income	\$ _____
Total Project Costs	\$ _____
How Much Money Made or Lost	\$ _____

# MANAGING A SMALL LAYER FLOCK

## POULTRY, LEVEL III

### Activity Sheet 9, Small Laying Flock Record, *continued*

#### FEED RECORD

Record the kind, amount, and value of feed each time a purchase is made or a quantity of home-raised feed is set aside for the project.

Date	Kind of Feed (grain, mash, supplement, etc.)	Quantity of Feed (lbs., bu., etc.)	Cost		Remarks: Beginning ration, feed changes, feeding problems, etc.
			\$		
Total Feed Costs			\$		

- |   |   |
|---|---|
| 1. Date birds purchased _____               | 5. Percent death loss _____ %                   |
| 2. Date project started: _____ ended: _____ | (divide line 4c by line 4a x 100)               |
| 3. Number of days of project _____          | 6. Pounds of feed used _____                    |
| 4. Number of birds started (a) _____        | 7. Dozens of eggs produced _____                |
| Number of birds raised (b) _____            | 8. Pounds of feed to produce a dozen eggs _____ |
| Number of birds that died (c) _____         | (divide line 6 by line 7)                       |

#### EGG PRODUCTION RECORD

Month	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Totals or Average
No. birds beginning of month													
No. birds removed													
No. birds end of month													
Ave. no. birds for month													
Total eggs laid													
Eggs per hen housed													
Ave. price per dozen													
Total value all eggs produced													



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# Culling the Layer Flock

*Poultry, Level III*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- Four reasons for culling non-laying hens
- The bleaching order in a laying hen
- Physical characteristics that reflect a hen's state of productivity

### ABOUT THEMSELVES:

- Criteria needed to make decisions
- The importance of planned decision making

## Materials Needed:

- Pictures of birds that appear to be layers or non-layers from magazines and advertising literature
- Leader Sheet, Characteristics for Laying and Non-Laying Hens
- Live birds from a laying flock (don't mix birds from flocks)
- Chalkboard or newsprint
- 3 × 5-inch cards

**ACTIVITY TIME NEEDED:** 45 MINUTES

## ACTIVITY:

On occasion, the flock will need to be culled. Culling is removing or selling poor quality, non-egg laying birds. There are several **reasons for culling** the laying flock: (1) to save the cost of feeding unproductive hens; (2) to remove non-layers to provide more space for the remaining flock; (3) to salvage non-producing birds for stewing or other poultry meat uses, and (4) to select birds for a second year of production if desired. By learning how to tell layers from non-layers, you will be able to have a more profitable poultry flock and use the meat by-products.

Most breeds of chickens used in the United States to produce eggs have yellow-pigmented skin and shanks. This pigment, which is in feeds such as yellow corn and green grass, is deposited in the skin, beak, shanks, and feet of the growing pullet. When the pullet starts to lay eggs, the pigment, instead of being deposited in the skin and shanks, is deposited in the egg yolk. This results in loss of pigment (**bleaching**) in a definite order from the pullet's body. The order is vent, eye ring, ear lobe, beak, bottom of the foot, front of the shank, back of the shank, and the hock and top of the toes. When a hen stops egg production, the pigment returns to the skin in the same order it was bleached. After a flock has been in production for several months, hens that show signs of repigmentation or have a lot of yellow pigment in their skin are poor producers.

## Leader Notes

Ask members to identify reasons for culling. List on chalkboard or large paper and discuss.

Using the Leader Sheet, Characteristics for Laying and Non-Laying Hens, make cards that list the individual characteristics. Have either individuals or teams sort the characteristics into laying and non-laying lists. Score correctness of answers and/or speed in finishing the assignment.

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## Leader Notes

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Using pictures or live birds, have each member or group place each bird in a laying or non-laying category. Give reasons for placement. The characteristics or reasons could also be listed on chalkboard, flip chart or sheet of paper by each individual.

Certain external **physical characteristics of a hen** will also accurately reflect her **state of productivity**. As a pullet prepares for egg production, the levels of the sex hormones increase in her body causing enlargement and reddening of the comb and wattles, enlargement and moistening of the vent, spreading of the pubic bones, softening of the abdominal skin and enlargement of the abdominal cavity. The latter is necessary to accommodate the extra space required by an enlargement of the digestive and reproductive systems.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What do you think is the most obvious laying hen characteristic to identify? Why?
2. Which non-laying hen characteristic was most difficult to identify? Why?

#### **Process:**

3. What are the main reasons for culling non-laying birds?
4. What is the bleaching (loss of pigment) order in a pullet's body when she begins egg production?
5. What are some of the characteristics, or criteria that indicate a hen is producing eggs?

#### **Generalize:**

6. What criteria do you use to make decisions about items you buy?
7. How important is it to be consistent in your decision making approach?

#### **Apply:**

8. How will this activity affect your decisions in the future?
9. What future decisions will require a criteria list? Why?

### **GOING FURTHER:**

- Go into the chicken house and pick out birds that you suspect are non-layers. This is often best done at night with a flashlight. You will disturb the birds less. Examine those birds that appear to be non-layers by looking for the egg-laying indicators. Have an experienced poultry raiser check your reasoning, or if possible, put the birds you cull into a separate area and check their egg production for a week to determine your ability to sort layers from non-layers.
- Identify parts of a chicken that reflect its reproductive state.
- Participate in a judging contest and judge egg-production hens.

### **REFERENCES:**

*Poultry Judging*, 4-H 92, Nebraska Cooperative Extension

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## CULLING THE LAYER FLOCK

### POULTRY, LEVEL III

#### Leader Sheet, Characteristics Identifying Layers and Non-Layers

Laying Hen Characteristics	Character	Non-Laying Hen Characteristics
Large, red, waxy	Comb, wattles	Small, scaly, shriveled
Bleached or bleaching	Beak	Yellow or growing yellow
Bright, prominent	Eyes	Dull, sunken
Bleached	Eye ring	Yellow-tinted
Flexible, wide apart, thin	Pubic bones	Rigid, close together, blunt
Soft, pliable	Abdomen	Hard, contracted
Large, moist, bleached	Vent	Dry, puckered, yellow
Worn, some broken or missing	Feathers	Maybe molting, new appearance
Short, deep	Head	Thin, shallow
None, or if in progress, a rapid molt	Molt	In progress, slow

Note: After the activity, give a copy of this sheet to each member as a handout to put in their record book.

**Think Back:**

What are the most significant factors affecting egg production in a laying flock? Why?

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# Adaptations for Flight

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- How a bird's skeleton is adapted for flight
- Parts of a flight feather
- The difference in bone density of birds versus mammals

#### ABOUT THEMSELVES:

- Adaptations or physical characteristics unique to humans
- Their abilities that can be used to cooperate with others

#### Materials Needed:

- Member Handout 8, Bird's Respiratory System
- Flight feathers
- Microscope or magnifying glass
- Leg bone of a bird
- Chalkboard or newsprint

#### ACTIVITY TIME NEEDED: 45 MINUTES

#### ACTIVITY:

Flight is not usually one of the first thoughts we have when we're working with domesticated birds, but it is still important and interesting to look at the adaptations of the bird's skeletal and respiratory systems which enable them to fly.

First of all, as we look at a diagram of the bird's respiratory system, you will notice that they have more than a pair of lungs like mammals. In addition to their lungs, birds have an air sac system where air is stored and warmed. Most birds have eight air sacs. Unlike mammals whose lungs expand and contract when they breathe, the lungs of birds do not expand and contract. When a bird inhales, air is drawn through the lungs into the air sacs. When a bird exhales, air is forced out of the air sacs, back through the lungs where air exchange takes place, and then out of the body.

Birds also have air cavities in the principal bones of the body, such as the skull, humerus, keel, clavicle, and lumbar and sacral vertebrae. These bones, which are hollow and connected to the respiratory system, also serve as a storage site for air and reduce the weight of the bird for flight.

The skeletal system of birds is designed specifically for flight. It is light in weight because of the air cavities within the bones, which we talked about before.

#### Leader Notes

Before starting this lesson see how many flight adaptations of a bird's anatomy the members can name and explain to the group.

Pass out Member Handout 8, Bird's Respiratory System, and point out the air sacs in a bird's body.

Have a member examine a leg bone of a bird and notice the hollow core.

As you discuss the skeletal system, have members follow along on the skeletal diagram.

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## Leader Notes

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List on a chalkboard or newsprint a summary of main flight adaptations of birds.

Although a bird's skeletal system is similar to a mammal's, there are several differences. First, birds possess an extra pair of bones in the shoulder area, called the coracoids. This pair of bones allows wing movement and offers additional support of the wings.

If you look at the spine, you will see several differences from the spine of mammals. The cervical vertebrae (neck bones) form an S-shaped column connecting the body to the head. This S-shaped column acts as a spring to cushion the head when a bird lands. Unlike mammals who can bend their backs, the vertebrae along the trunk and body of the bird are fused together, making them stiff and rigid. This provides additional support for the wings.

A bird's skeleton is also different from that of mammals in that the skeleton of the bird's neck does not always have the same number of vertebrae. A dog has just as many cervical vertebrae as a giraffe—seven, but long-necked birds may have as many as 25 vertebrae, while short-necked birds may have only 11.

A bird's wing consists of bone, muscle, tendons, nerves, connective tissue and many feathers. The forelimb is modified into a wing. If you look closely, you will see that birds have only a few bones in the outermost part of the wing skeleton. This is called the hand part of the wing since it is similar to the human hand. The inner part of the wing skeleton, which consists of the humerus, radius and ulna, is called the proximal wing or arm.

Skin and muscle are also important in the wing's structure. The skin forms membranes joining the different parts of the wing and fills in the spaces between the bones.

Another adaptation for flight in birds is the extensive development of the pectoral (breast) muscles that are attached to the wings and breast bone. These muscles have been called a powerful air-cooled motor, designed for flight. The greater portion of these muscles appears to be on the body proper because of their extensive attachment to the sternum. It is estimated that muscles in this region weigh about as much as do all the rest of the muscles and may account for 15 to 20 percent of the bird's weight as compared to less than 1 percent of a human's total weight. Although the ability to fly is not of primary consideration in poultry, the ratio of breast meat to total body weight is important since breast (white) muscle is preferred by most consumers.

The breast muscle of chickens is very light in color due to a low level of the pigment myoglobin. This pigment, which is similar in structure to hemoglobin, carries oxygen to the muscle cells. The amount of myoglobin depends on the flight pattern of the bird and the level and duration of muscular activity. Reduction in muscular activity lowers the level of myoglobin and causes the lighter color of the muscle. This is the reason why the breast muscle of chickens and turkeys is lighter in color than that of ducks.

Now, let's take a look at the flight feathers. If we look at a flight feather under a microscope or magnifying glass, we can see there are many barbs that branch out from either side of the shaft. Each of these branches in turn branches out into many barbules. In a flight feather of a pigeon, about 1,000 barbs branch from either side of the shaft, which in turn branch out into 550 barbules. The total number of barbules in a single feather of a pigeon could total nearly a million. On the tips of the barbules are tiny hooks called barbicels. These hooks interlock and give rigidity to the feather fibers. When the wings are furled, the individual flight feathers lie one over the other like shingles. The many air spaces left between them make the whole structure very light and insulate it against heat loss. The muscles of a bird in flight extend the wing, and the feathers slide past one another to maintain a thin surface, resembling a fan.

Have members look at a flight feather under a magnifying glass or microscope and identify the barbs and barbules. Refer to member handout, Parts of a Feather, from Level II Lesson, Types of Feathers and Their Functions.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What flight adaptations were new to you?
2. Which flight adaptations do you think are unique? Why?

#### **Process:**

3. What is significant about a bird's respiratory system?
4. How is a bird's skeleton adapted for flight?
5. What is significant about a bird's muscle structure? Why?
6. What are the unique characteristics of flight feathers that greatly enhance flight?

#### **Generalize:**

7. What did you learn about yourself through this activity?
8. What adaptations or characteristics do humans have that other mammals do not?

#### **Apply:**

9. What learning, knowledge or social skills do you have that will prepare you for future jobs or careers?
10. What abilities do you think will be needed to work well with others? Why?

### **GOING FURTHER:**

- Research the role air sacs have during courtship of some male birds.
- Compare a bird's flight adaptations to those of an airplane and share with your group or class at school.

### **REFERENCES:**

*Bird Flight*, George Rippell, VanNostrand Reinhold Co.  
*Poultry Science*, Ensminger

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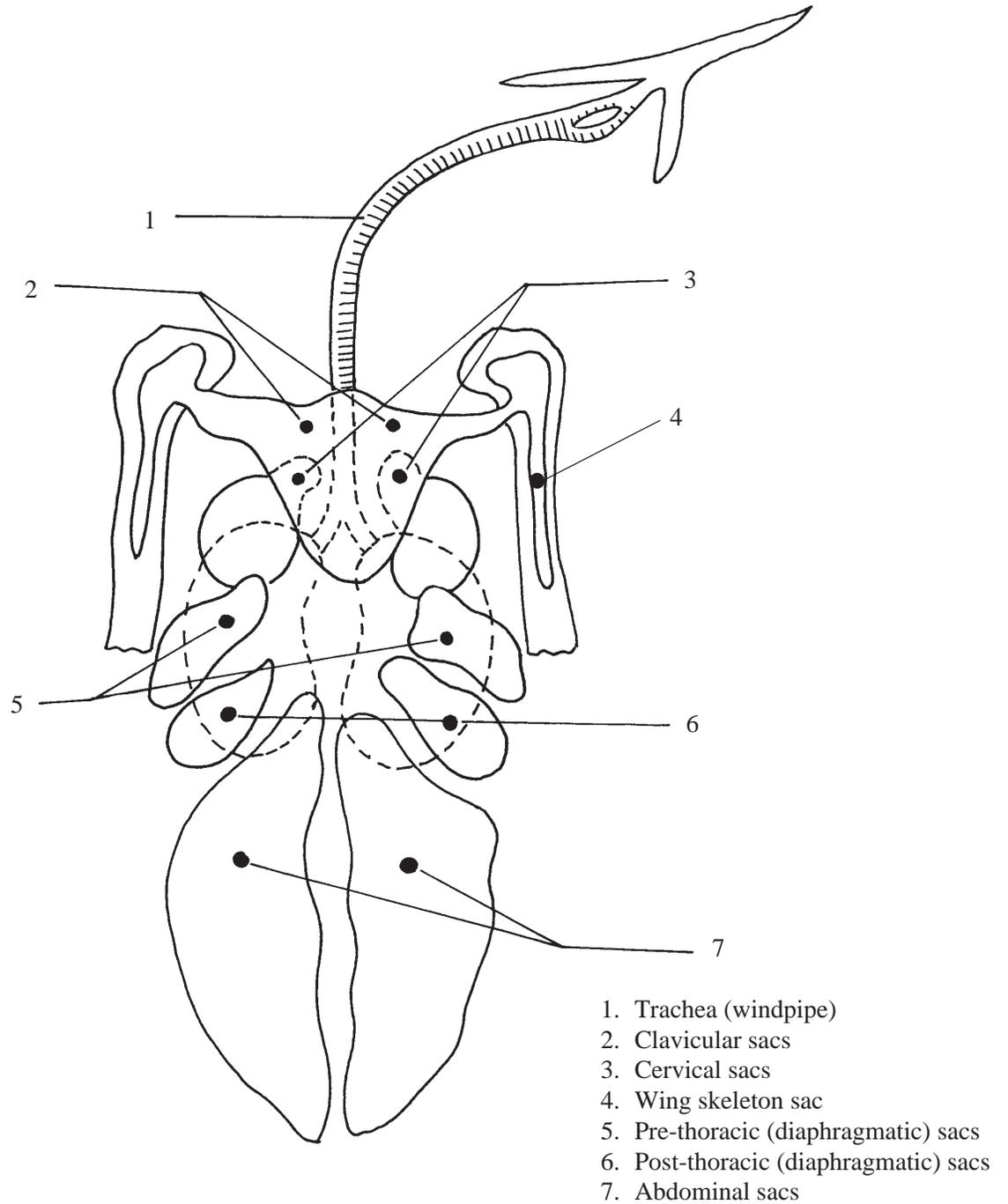
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**ADAPTATIONS FOR FLIGHT**  
**POULTRY, LEVEL III**  
**Member Handout 8, Bird's Respiratory System**







# Flight Prevention

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Three methods of preventing flight of chickens
- The difference between temporary and permanent methods of flight prevention
- Why flight prevention is desirable or used

#### **ABOUT THEMSELVES:**

- The purpose of prevention or safety in their lives
- How they feel about mandated safety or health prevention

#### **Materials Needed:**

- Day-old chicks, if available
- Cardboard drawing of the wing of a chick showing the location of the tendon and the outermost section of the wing
- Pair of sharp scissors or dewinging attachment on an electric beak trimmer
- Several adult birds
- Pair of hedge clippers or heavy shears
- Cardboard replica of chick and adult bird wings (actual size)
- Member Handout 9, Feather and Wing Clip Locations

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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It is desirable to discourage birds from flying when they are in fenced outdoor pens or range areas. The methods used to prevent flight involve altering the structure of one wing in a manner that unbalances the bird, making flight difficult. Some of the methods are temporary, some should be done when chicks are 1 day old. Some methods may result in lowered market quality of meat-type birds, and all may interfere with mating, particularly with the males.

All flight prevention methods subject the birds to stress, thus the operation should not be performed when the birds are sick, during vaccination or during hot weather. If possible, administer a stress medicine two to three days prior to and after the operation.

#### **FLIGHT PREVENTION METHODS:**

1. **Feather clipping** involves cutting the flight or large wing feathers of the adult bird about two-thirds of the way down from the tips of the feathers with sharp, heavy shears, hedge clippers, or with a sharp hatchet and chopping block. Feather clipping is a temporary measure.

Demonstrate the flight prevention procedures and allow members to practice on cardboard replicas of wings. After practice, let members do some of the procedures on live birds (if possible).

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## Leader Notes

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Two people are required to feather clip a bird. One person should hold the bird's feet in one hand and spread its wing with the other hand by pressing on the wing next to the bird's body. The other person then can clip the feathers of the extended wing.

2. **Wing clipping** involves removing the outermost section of one wing of a day-old bird with a vertical hot wire or hot steel bar on an electric debeaking device. Sharp scissors can also be used, but there will be some bleeding from the wound.
3. **Wing notching** uses the same type of equipment as wing clipping. It involves severing the tendon that crosses the center of the outermost wing joint (see illustration on Member Handout 8, Feather and Wing Clip Locations). This method can be done from day-old to 5 to 7 weeks of age.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What did you use to clip bird feathers? Cardboard? Why?
2. Did you try any wing clipping or notching on young birds? If so, what was the most difficult? Why?

#### **Process:**

3. Why is feather clipping of adult birds a temporary method of flight control?
4. When would permanent flight prevention not be desirable?

#### **Generalize:**

5. Flight prevention is a restraining device; what other restraining devices are used with other animals? Why?
6. What safety prevention devices do people use? Why?

#### **Apply:**

7. How do you feel about mandated use of safety devices?
8. What areas of prevention do you think should be an individual choice as opposed to mandated by law? Why?

### **GOING FURTHER:**

- Discuss the rights of production or food animals as opposed to companion animals.
- Invite someone with a different perspective to discuss flight prevention with your group.

### REFERENCES:

#### Author:

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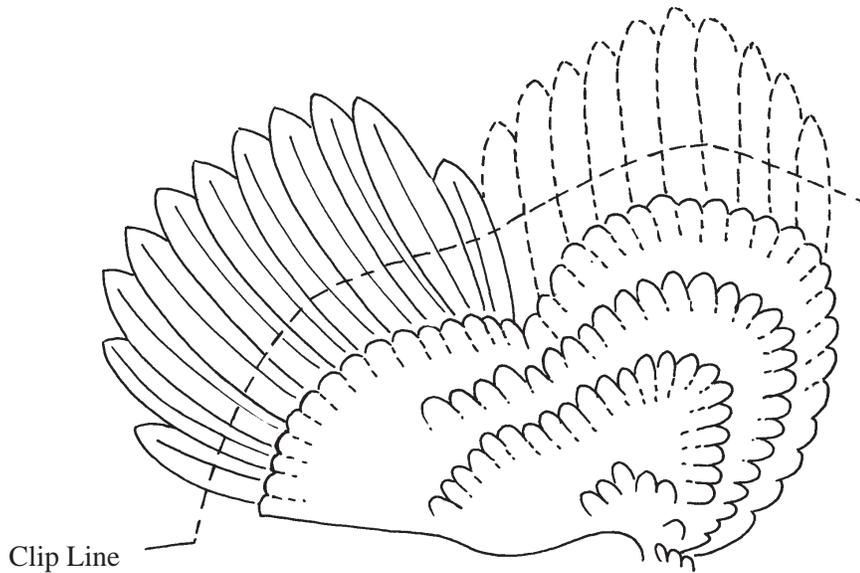
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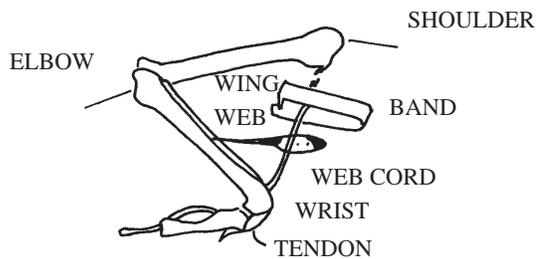
## FLIGHT PREVENTION

### POULTRY, LEVEL III

#### Member Handout 9, Feather and Wing Clip Locations



Feather Clip—Adult



Wing Clip and Notch—Chick  
or  
Sever wing or tendon at wrist

**Think Back:**

What is the importance of flight in wild birds as compared to domestic birds?

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# Eggs—Normal and Irregular

*Poultry, Level III*

## What Members Will Learn . . .

### ABOUT THE PROJECT

- The abnormalities in the physical characteristics of eggs and what causes them

### ABOUT THEMSELVES:

- Their feelings about abnormalities

### Materials Needed:

- Samples or pictures of abnormalities and irregularities of eggs
- Chalkboard or large paper

**ACTIVITY TIME NEEDED:** 30 MINUTES

## ACTIVITY:

Today, we'll take a look at some of the abnormalities and learn what might have caused them. But first let's consider what a normal egg should look like.

How many of you know or have seen an animal with a birth defect? The causes of these birth defects may be caused by a variety of things, such as poor nutrition, use of drugs, genetics, physical trauma, etc.

Malfunction of the hen's reproductive system may also result in abnormalities such as double-yolk eggs, eggs with bloodspots, yolkless eggs, shell-less eggs, an egg within an egg and eggs with defective shells.

Let's discuss some of these abnormalities:

**Soft-shelled egg**—This is an egg the hen lays after the shell membranes have been added in the isthmus but before the hard shell is added in the uterus. Many times if a hen is frightened she will lay the egg before the hard shell is added.

What causes a **bloodspot** in an egg? A bloodspot occurs in an egg when the membrane holding the yolk doesn't rupture along the suture line, resulting in hemorrhaging (or bleeding) from breaking of a blood vessel. Hemorrhaging may occur if a hen is frightened or handled roughly when the yolk is leaving the sack. Factors contributing to this problem are genetics, excessive fright (wild birds, rodents, etc. scaring the birds), lack of vitamin K and access to rodent poisons containing anticoagulant drugs.

## Leader Notes

Use Level II lesson, Cracking Up—What's In An Egg to review normal egg physical characteristics. List on chalkboard or newsprint.

Have members identify some abnormalities or birth defects in other animals.

If possible, show samples or pictures of these abnormalities while you discuss these with your members.

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## Leader Notes

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What causes abnormal eggs such as **double-yolk eggs**, yolkless eggs, and an egg within an egg? The most common cause is two yolks are released from the ovary at the same time. Then, these two yolks are picked up by the oviduct and made into one egg.

**Yolkless eggs**—something foreign to the oviduct, such as a piece of tissue, stimulates the oviduct to secrete thick white that is then surrounded by the other parts of the egg as it travels down the oviduct.

**Egg within an egg**—a completely formed egg in the uterus for some unexplainable reason goes back up the oviduct and has the thick albumen, thin albumen, shell membranes and hard shell added as it returns.

**Defective or severely misshaped eggshells**—caused by a defect of the oviduct, or two eggs touching each other in the oviduct. Usually, it is the same hens in a flock that consistently lay eggs with deformed shells.

**Worm in an egg**—very infrequently, a roundworm will get into the oviduct and be incorporated into the egg.

**Variability in egg yolk color**—the color in egg yolks and the skin of yellow skinned breeds of chickens comes from the pigment called xanthophyll which is found in green plants and yellow corn. If hens are fed a ration that has very little of these ingredients, their yolks will be light yellow in color and vice versa. Variability of yolk color in a flock can be due to disease and from hens fed free choice which causes variability in the intake of pigmented ingredients between hens.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many abnormalities have you observed in eggs? When? How often?

#### **Process:**

2. What are the causes of various egg irregularities?
3. What can a producer do to prevent egg irregularities?

#### **Generalize:**

4. What other abnormalities have you observed? When? Where?
5. Does physical appearance change the value of an item? How? When?

#### **Apply:**

6. What are the issues included in the Americans With Disabilities Act? (Discuss)
7. How will you act differently in the future as a result of this activity?

### **GOING FURTHER:**

- Attend a judging contest where eggs are graded.
- Visit a store and observe physical differences in eggs, particularly between Grade A and Grade B eggs.
- Give a presentation to a group or class about normal and irregular eggs.

### **REFERENCES:**

*Poultry Handbook*, Department of Animal Sciences, Kansas State University

### **Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed By:**

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# Marketing Eggs and Poultry Products

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Forms of eggs sold
- Ten poultry products found in most food stores
- Factors that affect egg and poultry meat quality
- How to determine a fair price for products you sell

#### ABOUT THEMSELVES:

- Their own consumer shopping skills when buying clothing, food, etc.
- How they feel about quality of products they buy and/or sell

### Materials Needed:

- Activity Sheet 10, Consumer Product Evaluation Worksheet
- Clipboards or hard writing surface
- Pens or pencils for members
- Activity Sheet 11, Product Pricing

**ACTIVITY TIME NEEDED:** 60 MINUTES

### ACTIVITY:

### Leader Notes

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The egg is one of nature's most versatile food products. Nutritionally, it is one of nature's most completely packaged food products. To the egg producer, the egg is the major source of income.

Marketing eggs involves the process of getting the egg from the farm to the consumer. Eggs are a perishable product that must be collected from wide areas of production and transported to major centers of consumption without losing egg quality.

Most **shell** eggs are sold by the dozen directly from the producer or on a **weight and grade** basis commercially. Eggs that are converted into **egg products** are sold on a **net weight** and **liquid yield** basis.

The number of businesses involved in marketing eggs and the length of time between when the egg is laid and its arrival in the food market have declined in recent years. A typical egg marketing chain is producer-processor-retailer-consumer. Most eggs are transported on **filler flats** or **cartons** in 30-dozen cardboard cases in refrigerated trucks.

#### Processing Shell Eggs

Eggs pass through many processes on their journey from the hen house to the food store. First, the eggs are **cleaned**, which involves washing in a sanitizing solution.

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## Leader Notes

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Next, the eggs are **graded for quality**. Egg quality is based on certain characteristics that affect the egg's **physical appearance, functional properties** (uses) and **nutritional content**. Grading eggs involves sorting them into similar groups according to standard quality and weight standards. Grading encourages orderly marketing. Most eggs purchased by consumers are graded according to USDA standards. Grade quality factors are divided into two categories.

**Exterior** quality factors affect the outside appearance of the egg shell and the ability of the egg to reach the final consumer unbroken. Factors are shell **shape** and **texture, soundness, cleanliness** and **color**. The consumer's first impression of a carton of eggs is their exterior quality or appearance.

**Interior quality** factors affect the broken-out appearance and the **functional properties** of the egg. When grading an egg's interior quality, the **position** and **movement** of the yolk are considered. Egg quality is related to the thickness of the albumen. Thick albumen permits limited movement of the yolk and an indistinct yolk shadow results. The opposite is true of thin albumen. Appearance of the yolk involves the presence of foreign materials such as blood and meat spots, and the size and shape of the yolk. Eggs that are rotten, show blood rings, or contain large blood and meat spots are **loss** eggs, and are unfit for human consumption. Eggs with dirty or cracked shells are called **restricted** eggs, and must be broken and the liquid pasteurized before being used for human consumption. The **depth** of the air cell is a measure of loss of moisture from the egg.

Eggs are graded by **candling**, which is observing the exterior and interior quality of unbroken eggs by rotating the eggs while a beam of light passes through them. Candling is either done by hand or by a mass scanning machine. Consumer grades for small eggs are AA, A, and B. All other edible eggs are classified as **undergrades**. Specific tolerances are allowed in a pack of eggs so that not every egg in a case of grade A eggs has to be a grade A egg. This allows for some variations in quality as eggs move through marketing channels.

Next, the eggs are individually weighed into six consumer weight classes.

### Consumer Weight Classes of Eggs

Class	Minimum weight/ dozen (ounces)	Minimum net weight/ 30 dozen (pounds)
Peewee	15	28
Small	18	34
Medium	21	39 ½
Large	24	45
Extra Large	27	50 ½
Jumbo	30	56

### Processing Eggs on the Farm

There are limited opportunities, particularly in the less populated areas of the state, for producers to process and sell their eggs or poultry directly to consumers, institutions, restaurants or retailers.

Direct marketing of your eggs or poultry can be profitable, but it can also be time-consuming. You need to be sure that you have the facilities, the time, the salesmanship ability, a consistent supply of high quality products and the market outlets before entering direct marketing.

There are many things to take into consideration when pricing your product for sale. Producers tend to underprice their eggs and poultry and fail to count all of their processing and marketing costs. Base your selling price to customers on a local market or nearby graded market. Add to this quoted price your processing and marketing costs above production costs, plus the amount of profit you expect to make.

### Kansas Egg Law

The Kansas Egg Law regulates the sale of eggs to consumers. A producer selling eggs of his/her own production direct to the consumer is exempt from this law. A producer may sell eggs to consumers at the producer's farm or on a route to individuals or to institutions such as nursing homes. Local health requirements may take precedence over this law in the case of institutions.

Major provisions of the Kansas Egg Law are:

- Eggs must be "Grade B" quality or higher
- The container (carton) must be plainly marked to show the size, quality, and name of vendor, retailer, or food purveyor and the inspection fee stamp.

### Egg Products

About 20 percent of all eggs are broken-out and processed into egg products for inclusion in various food products. These products are used in foods not only to enrich the foods nutritionally, but because of the egg's functional properties of foaming, leavening, thickening, binding and emulsifying.

Eggs that are to be broken are candled and cleaned like eggs for the shell egg market. Then the eggs are broken by a machine that separates the liquid from the shell and also can be set to separate yolk and albumen. Next, the liquid is mixed or homogenized into a stable liquid. The albumen is stabilized by desugaring by enzymatic or bacterial fermentation. Regulations require that all liquid egg be pasteurized to destroy pathogenic microorganisms. Lastly, the liquid is put in cans for freezing or dried and stored as a powder. Pan-dried albumen is used by confectioners. Albumen, whole egg, and yolk are spray dried for use by the baking industry.

Many different types of egg products are made. Examples are frozen or dried albumen, whole egg, whole egg blends that contain sugar, salt and added yolk, plain yolk, yolk with added salt and yolk with added sugar.

Hand out Activity Sheet 11, Product Pricing. Go over and explain each of the types of costs with members.

### Grocery Store Search

Take members to a grocery store, split them up into groups, and have them search and make a list of egg products that are sold. Have them write down product name, location of product in store, weight and unit price of each item. (Use Activity Sheet 10, Consumer Product Evaluation.)

After 15 to 20 minutes, gather group back together and find out what the members found. Walk through the store and look at the items members located. Have members discuss what products they would buy and why.

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## Leader Notes

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As you examine each product, go over all the information asked for on the activity sheet.

### **Proper care and handling of eggs by consumers**

The same nutrients that make eggs a high-quality food for humans can also be a good growth medium for bacteria that have the potential to cause food-borne illnesses. Nearly all reported cases of food-borne illnesses associated with eggs or foods containing eggs have been associated with improper handling. Following these handling practices will reduce the danger of food-borne illness from eggs.

- Store eggs at 45°F or below
- Don't use dirty or cracked eggs
- Cook eggs until white is completely firm and yolk begins to thicken
- Use pasteurized egg products in recipes that call for large quantities of eggs
- Serve egg dishes within 1 to 2 hours
- Store eggs away from strong odors
- Don't use recipes that contain raw eggs
- Hold cooked eggs below 40°F or above 140°F
- Avoid cross-contamination of cooking utensils

Information about the Kansas Egg Law and the Kansas Meat and Poultry Inspection Law can be obtained by contacting the Division of Inspections—Meat and Poultry, State Department of Agriculture, 901 S. Kansas, 7th Floor, Topeka, KS 66612, (785) 296-3511.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many poultry products did you find in the store search?
2. What products were found the most often? Least often? Why?

#### **Process:**

3. What quality factors affect the value of eggs?
4. What are some food handling practices that will reduce the danger of food-borne illnesses?
5. If you had eggs to sell, how would you determine your selling price?

#### **Generalize:**

6. How important is quality and wholesomeness in the products you purchase? Why?
7. What affect does quality have on price?

#### **Apply:**

8. How will the store search pricing exercise help you with future purchases?
9. In what other areas of your life can you use this pricing procedure?

### GOING FURTHER:

- Tour a poultry farm and an egg-processing facility to see how they process eggs for packaging and shipping.
- Learn how to determine egg quality grades.
- Ask a grocery store owner where he/she purchases his/her eggs and how he/she determines where to buy them.

### REFERENCES:

#### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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**MARKETING EGGS AND POULTRY PRODUCTS**  
**POULTRY, LEVEL III**  
**Activity Sheet 11, Product Pricing**

Below is information that should be considered in determining the price to charge for your products. Cost will vary depending on volume, type of equipment, distance from market, number of deliveries and labor efficiency.

Using these cost items as a guide, insert your actual costs.

<b>Type of Cost*</b>	<b>Cents per Dozen</b>
Cartons	_____
Cases	_____
Labor in Egg Room	_____
Transportation Expense	_____
Miscellaneous**	_____
<b>Total</b>	_____

\*These costs are in addition to the cost of producing eggs.

\*\*Includes processing and storage equipment, utilities, storage and supplies.





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# Food Safety

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- Five members of the food safety team
- Five bacteria that cause foodborne illnesses
- Three basic rules to reduce food related illnesses

#### ABOUT THEMSELVES:

- How they feel about food safety issues covered by the media
- How they feel about the need for government regulations and inspections
- How safe their family's food handling procedures are

#### Materials Needed:

- Publications about food additives and sources of food-borne illnesses
- Pencils
- Activity Sheet 12, Food Safety Article Survey
- Activity Sheet 13, Food Safety Field Trip Summary
- Activity Sheet 14, Problem Kitchen Exercise

#### ACTIVITY TIME NEEDED: 60 MINUTES

#### ACTIVITY:

America's food supply is one of the safest in the world, yet it is estimated between 21 and 81 million Americans suffer from a food-related illness each year. A large number of these illnesses can be prevented by proper food handling at home.

Two concerns related to food safety are chemical contamination and microbiological contamination. Because a large number of food-related illnesses are caused by improper food handling at home and are preventable, it is important to learn safe food handling practices.

**Food Safety Team**—These are the people responsible for protecting the American consumer.

1. **Government agencies**, such as the Animal and Plant Health Inspection Service (APHIS) and Food and Drug Administration (FDA) make the food safety regulations, or rules, and ensure that everyone follows them. All phases of poultry production, processing and marketing are regulated by governmental agencies. Government officials inspect the processing of poultry products (eggs and meat) to ensure they are safe and wholesome; they keep records of the chemicals used, and they test products in response to complaints from consumers.

#### Leader Notes

Have members collect newspaper and magazine articles about food safety in the poultry industry. Use Activity Sheet 12, Food Safety Article Survey, to evaluate and summarize each article.

Discuss the differences between chemical and microbiological contamination.

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## Leader Notes

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2. **Producers** use the safest and most modern methods to assure a plentiful and disease-free supply of poultry products. They follow strict rules on how to administer drugs to keep their flocks healthy without the meat or eggs containing harmful residues.
3. **Processors** process the poultry products that producers sell to them. Processors put labels on their products to inform consumers about their products. The term “inspected for wholesomeness” means the product is edible. The term “Grade A” indicates the quality of the meat. Both terms appear on the wrapper of most ready-to-cook poultry products. The term “Grade A” or “B” on a carton of eggs indicates the quality of the eggs and “Medium, Large, Extra Large, etc.,” indicates the size or net weight of the eggs.

Processors also follow government regulations that are made to protect consumers. Processors also may use approved chemicals to prevent spoilage and/or improve the taste, texture, appearance, or freshness of poultry products. Government regulations strictly control the use of such additives.

Plan a food safety trip to a local food store. Use Activity Sheet 13, Food Safety Field Trip Summary, to record your observations and highlights.

Have members ask their parents how they ensure safe handling of poultry products. Then have members suggest ways their families can handle poultry products more safely.

Ask members what kind of poultry products they typically help prepare. Ask them to identify any food safety violations they realize they have made in the past. How will they change their behavior in light of what they have learned?

4. **Retailers** are the store owners who sell poultry products to consumers. They train store personnel in safe handling of poultry products. They make sure storage and display areas are clean and that the products are not too old or unsafe to eat. For example, a carton of eggs has a pull date on it which indicates the date the eggs should be removed from the case and reprocessed.
5. **Consumers** are the best line of defense against the bacterial contamination of food. It is the responsibility of consumers to properly prepare and store poultry products.

### FOOD SAFETY AND CHEMICALS

Chemicals in poultry products are a controversial subject. One reason is current analytical methods are so powerful, very small amounts (parts per billion—ppb) of chemicals can be detected. In most cases, the concentrations detected are so low that they present little or no health risk to consumers.

Examples of chemicals used in the production of poultry products are drugs to prevent disease outbreaks and to make the birds grow faster or to produce more eggs; food additives to prolong freshness and to prevent spoilage; and color additives to improve the appearance of the products.

### FOOD SAFETY AND FOODBORNE ILLNESSES

Food-related illnesses are caused by a combination of naturally occurring foodborne bacteria and the unsafe handling of food. The most common foodborne illnesses are caused by bacteria. Five common bacteria are:

1. **Salmonella** bacteria cause 40 percent of all foodborne illnesses. There are over 2,000 different types of salmonella microorganisms, but only a few cause foodborne illness in humans. Salmonellae

microorganisms that are ingested, live and grow in the intestinal tract of people causing diarrhea, headaches, chills, fever, nausea, vomiting, and abdominal (stomach) pain. Salmonellae can be picked up at any time during the various stages of production, processing, storage and preparation of poultry products.

Hand out Activity Sheet 14, Problem Kitchen Exercise, and have members list the food safety mistakes they see. Then hand out the picture of the safe kitchen and discuss corrections that were made.

2. **Campylobacter jejuni** causes a foodborne illness called campylobacteriosis. The bacteria sometimes is found on poultry meat. Symptoms are fever, headache, muscle pains, diarrhea, abdominal pain and nausea. Important characteristics of this organism are that it prefers a low-oxygen environment and will survive longer in foods at refrigeration temperature than at room temperature.
3. **Clostridium perfringens** sometimes is a problem in the mass food service industry. The organism grows best in the absence of oxygen, on foods high in protein (meats) and at temperatures above 115°F. Unfortunately, this temperature is where many warm holding areas in food services are set to keep food warm.
4. **Clostridium botulinum** produces one of the most deadly toxins known to humans. Scientists estimate one cupful of this purified toxin would kill all the people on the earth. The toxin is formed when heat-resistant spores of the organism survive and germinate during storage, usually at temperatures above 38°F and in foods with a pH above 4.5. Illness from the toxin occurs mainly from ingesting improperly canned foods.

Initial symptoms are difficulty in swallowing, slowed speech and respiration, and double vision. Treatment includes administration of antitoxins.

5. **Staphylococcus aureus** foodborne illness occurs when the organism multiplies and forms toxins called enterotoxins in cooked foods that are high in protein such as poultry meat. Illness occurs when the food containing the toxin is eaten by people.

### FOOD SAFETY AND PREVENTION

Consumers can significantly reduce the risk of acquiring food-related illnesses by following these three basic rules:

1. Keep hot foods hot (above 140°F). Hot foods containing poultry products should be cooked to a temperature of 160°F.
2. Keep cold food cold (below 40°F). Neither hot or cold foods should be held for more than two hours in the danger zone of 40° to 140°F.
3. Keep all food preparation surfaces and equipment clean.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What unusual or common items did you find in the news article survey?

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## Leader Notes

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2. What are the common safety themes related to poultry products in stores and the media? Why?

### **Process:**

3. What are some groups that have food safety responsibilities?
4. What are the three basic rules to reduce food-related illness?

### **Generalize:**

5. Have you ever had a food-related illness? How sick were you? What caused it?
6. How do you feel about regulation and inspections required for food products?

### **Apply:**

7. Was there anything you learned from this lesson that will change your food-handling procedures? What? Why?

### **GOING FURTHER:**

- Share your findings with other groups—clubs, consumers, etc.
- Prepare a store display for a local food store to remind consumers of the process and how safe the products are.

### **REFERENCES:**

*Play It Safe: Goals for Food Safety*, P.O. Box 1400K, Dayton, Ohio 45414  
*Consumer Guide to the Care and Cooking of Chicken*, National Broiler Council, 1155 15th St., NW, Suite 614, Washington, DC 20005

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**FOOD SAFETY**  
**POULTRY, LEVEL III**  
**Activity Sheet 12, Food Safety Article Survey**

Directions: Use newspaper and magazine articles discussing food safety in the poultry industry to fill out the Food Safety Survey.

Title	Source	How Factual or Accurate	Number of Sides of Issue Presented	Biased or Unbiased
1.				
2.				
3.				
4.				
5.				
6.				
7.				

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**FOOD SAFETY**  
**POULTRY, LEVEL III**  
**Activity Sheet 13, Food Safety Field Trip Summary**

1. List poultry product handling procedures you observed.
2. What government regulations and inspections does the store observe for poultry products?
3. How does the store promote food safety? Display cases? Product wrappings, etc.?
4. What are the most recent food-safety issues, relating to poultry products, you have observed in the media?

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**FOOD SAFETY**  
**POULTRY, LEVEL III**  
**Activity Sheet 14, Problem Kitchen Exercise**

Directions: Cut along the dotted line. Hand out the “Problem Kitchen” picture first. Have members list and discuss problems. After members have had time to record observations, hand out the “Safe Kitchen” picture to compare responses.

**Problem Kitchen**

What might happen if the problem kitchen is not made into a safe kitchen?

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**Safe Kitchen**

**Bonus Question**

Find the difference in cooking methods between a microwave and a conventional oven. Why does cooking with a microwave contribute to the increased risk of bacterial contamination?

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# Egg Grading

## *Poultry, Level III*

### What Members Will Learn . . .

#### ABOUT THE PROJECT:

- The consumer grades of eggs
- How to candle eggs
- The steps in judging interior and broken-out quality of an egg
- To recognize differences in egg quality
- How to classify eggs into their correct grade

#### ABOUT THEMSELVES:

- To make qualitative subjective decisions
- Their feelings about criteria and standards for decision making

#### Materials Needed:

- Member Handout 10, Parts of an Egg Diagram and Air Cell Depth Gauge
- Member Handout 11, Interior and Exterior Quality Grades
- Egg Candler
- Member Handout 12, Broken-out Egg Quality Chart, USDA
- Eggs of different quality

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### ACTIVITY:

There are several factors that help determine the grade of an egg. Each egg is graded on its individual merits of quality (interior and exterior) according to the United States Department of Agriculture grades. The grades are AA, A, B, and Inedible. Knowledge of the parts of the egg is essential to understanding candling and grading.

**Candling** is used to judge exterior and interior egg quality. Although other factors help determine the grade of an egg, the interior quality is the most important.

#### HOW TO CANDLE

Hold the egg up to the candling light in a slanting position. You can see the air cell, the yolk and the white. The air cell is nearly always in the large end of the egg. Therefore, put the large end next to the candling light.

Hold the egg between your thumb and first two fingers. Then, by turning your wrist quickly, you can cause the inside of the egg to whirl. This will tell you a great deal about the yolk and white. When you are learning to candle, you will find it helpful to break any eggs you are in doubt about and observe them.

#### Leader Notes

Give members Parts of an Egg, Member Handout 10. Cover the words before copying. See how many parts they can label. Then review the parts of the egg you will be looking at when grading.

Have members take turns candling eggs. Place them in quality grades and then discuss as a group.

### STANDARDS OF JUDGING INTERIOR QUALITY OF EGGS

The grade of an egg is determined by several factors:

Refer to Member Handout 10, Air Cell Depth Gauge, for assistance.

1. **Air Cell Depth**—the distance from its top to its bottom when the egg is held with the air cell up. In a fresh egg, the air cell is small, not more than  $\frac{1}{8}$ -inch deep. As the egg ages, evaporation of moisture takes place and the air cell becomes larger and the egg is down-graded.
2. **Yolk**—the yolk of a fresh, high-quality egg will be surrounded by a rather thick layer of albumen or white. Therefore, it moves only slightly away from the center of the egg when it is twirled before the candler. Because of this, the yolk outline is only slightly defined or partially visible. As the egg ages or deteriorates in quality, the albumen thins and the yolk tends to enlarge to move more freely and to approach the shell more closely. The yolk then becomes more visible when candled.
3. **White or Albumen**—The character and condition of the white or albumen is determined largely by the behavior of the yolk of the egg when the egg is candled. When the egg is twirled, if the yolk retains its position in the center, the white is usually firm and thick.

Eggs with blood or meat spots more than  $\frac{1}{8}$ -inch in diameter are classified as inedible. Eggs with small spots less than  $\frac{1}{8}$ -inch in diameter should be classified as Grade B. Bloodspots should not be confused with the chalaza, a string of albumen that helps hold the yolk in the center of the egg. The chalaza may be prominent in some eggs. The chalaza is distinguished from a bloodspot by a bright area of refracted light that accompanies the darker shadow of the chalaza.

When grading eggs by candling, the lowest rated quality factor determines the grade. The quality factors considered are: air cell depth, yolk and albumen. For example, an egg may have a clearly defined yolk that is flat and at the bottom of the egg while the air cell is less than  $\frac{1}{8}$ -inch in depth. This egg would be a B grade.

The following will not be considered as quality factors when candling eggs for interior quality:

- Loose, bubbly or out-of-position air cell
- Exterior stains or dirt
- Faulty egg shell shape or texture
- Exterior quality

In commercial egg-processing plants, eggs are graded simultaneously for exterior and interior quality. However, in judging contests, it is necessary to grade eggs for exterior quality separately, because handling of eggs by contestants can change the grade. Exterior quality standards reduce the number of eggs with defects that detract from the appearance of the egg or that would have a low chance of surviving the rigors of handling in

normal market channels. In other words, we want the consumer to have clean, unbroken eggs that may have only minor defects. This is especially important when judges have gained experience in evaluating eggs with various degrees of abnormalities.

### EXTERIOR QUALITY GRADES

Let's look at the chart and identify some of the descriptive terminology used in the USDA Egg Grading Manual to help determine the grade of an egg by exterior quality. For 4-H Poultry Judging Contests, eggs will be assigned the grades of A, B and Dirty. Grades AA and A have identical exterior quality standards.

Have members examine the exterior quality of eggs and determine their grades. After everyone has completed the examination, compare answers and discuss.

**Stains**—Grade A eggs must be clean. These eggs can show traces of processing oil (used to preserve freshness). This processing oil may give a shiny or opaque appearance. Eggs with slight or moderate stains covering less than  $\frac{1}{32}$  of the shell, in one localized area, or  $\frac{1}{16}$  of the shell surface, if the stains are scattered, are assigned Grade B.

**Adhering Dirt or Foreign Material**—Grade A and B eggs cannot have any adhering dirt or foreign material. Eggs with adhering material (3-dimensional) larger than a speck should be classified as Dirty. Small specks of dust or lint that may have settled out of the air should not be considered.

**Egg Shape**—There is a considerable range of egg shapes that could be considered approximately the usual shape of Grade A eggs. Eggs that are perfectly spherical (round) or too long to fit in the egg carton should be graded B quality. B quality grade for egg shape will include eggs that are clearly misshapen, or have definite flat areas.

**Shell Texture**—Eggs with faulty texture are much weaker in shell strength and may be broken during distribution. Shells with large calcium deposits (greater than  $\frac{1}{8}$ -inch in diameter) should be classified as Grade B. Eggs with small calcium deposits are classified as Grade A. There is no standard for number of calcium deposits which means that small calcium deposits over the entire shell may be classified as Grade A if otherwise qualified. A good rule of thumb is if you were to pull your fingernail across a calcium deposit and there would be a good size hole if it came off, it would be classified as Grade B.

**Ridges**—Ridges can result in weakened shells. Many eggs show small ridges and most of these should be classified as Grade A. Those eggs with large ridges are Grade B.

**Shell Thickness**—The shell should appear thick enough to withstand reasonable handling without breaking. Grade A eggs must have a thick shell with no thin spots. Thin shells or thin spots would place an egg in Grade B. In all cases the shell must not be broken.

Give each member a copy of Member Handout 11, Interior and Exterior Quality Grades.

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## Leader Notes

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Have members examine broken-out eggs and determine their quality grade.

Give each member a copy of Member Handout 12, Broken-Out Egg Quality Chart, or acquire a colored chart from USDA.

### **BROKEN-OUT QUALITY**

Eggs broken-out will be Grades AA, A, B and Inedible. Eggs with spots (blood and meat) more than 1/8-inch in diameter will be classified as inedible. Eggs with spots less than 1/8 inch will be classified as Grade B.

The only other criterion that should be used to grade broken-out eggs is the height of the thick albumen relative to the size of the egg. The size, flatness, or position of the yolk should not be considered. Broken-out grade determination must be based on “U.S. Standards for Quality of Shell Eggs” from the USDA. Representative AA, A and B grade eggs from this chart are provided in the handout. The thick albumen retains the shape of the egg in a Grade AA and is thick, whereas there is a flattening and rounding of edges in a Grade A egg. The thick white in a Grade B egg is flat and barely visible.

You can learn to assign the proper grade by comparing actual broken-out eggs with the USDA broken-out egg chart. The diameter of the outline of thick white may give an indication as to grade; however, the height of the thick albumen is the most important factor in determining grade. For example, an extra large egg may have a rather large, thick albumen outline and also sufficient height of thick albumen to be Grade AA.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Which activity do you prefer? Candling, Grading, Grading Broken-Out Quality? Why?
2. What part of egg grading is most difficult? Why?

#### **Process:**

3. What are the major factors to determine interior egg quality?
4. What are the exterior egg-quality factors?
5. What criteria are used to grade broken-out eggs?

#### **Generalize:**

6. What did you learn about yourself through this activity?
7. What criteria do you use to select friends? How easy are these criteria to measure?

#### **Apply:**

8. Do all your friends have the same qualities? Why? Why not?
9. What basic standards do you apply to your decisions? Why?

### **GOING FURTHER:**

- Participate in a judging contest.
- Examine eggs from different breeds or strains of poultry and see if there is any difference in egg quality.
- Go to a grocery store and do a price comparison of various grades and sizes of eggs.

### **REFERENCES:**

*Poultry Judging*, 4-H 92, Nebraska Cooperative Extension

### **Author:**

Adapted from above reference by Cynthia R. Siemen, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed By:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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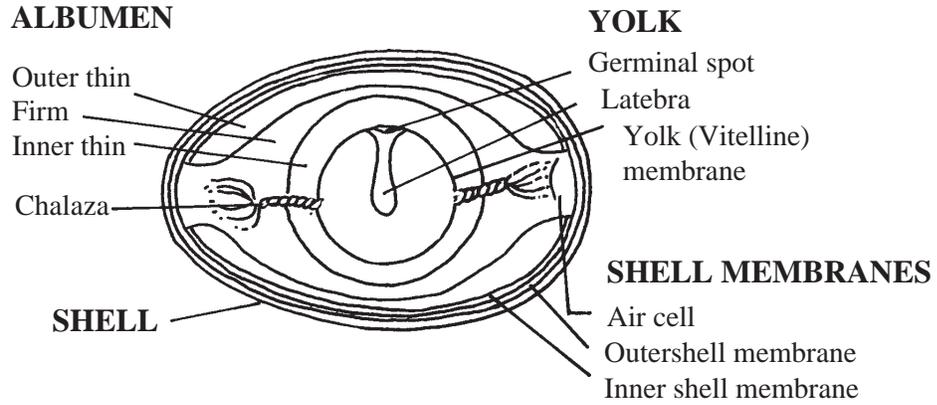
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# EGG GRADING

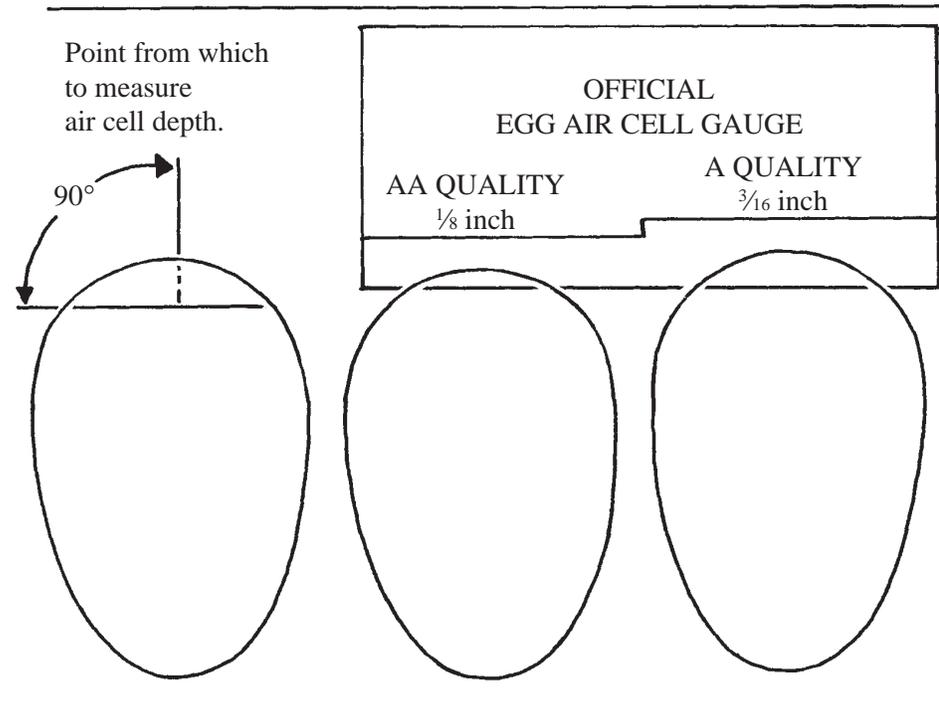
## POULTRY, LEVEL III

### Member Handout 10, Parts of an Egg Diagram and Air Cell Depth Gauge

Parts of an Egg



Air Cell Depth Gauge



## EGG GRADING

### POULTRY, LEVEL III

#### Member Handout 11, Interior and Exterior Quality Grades

##### Standard for Interior Quality of Eggs

Quality Factor	AA Quality	A Quality	B Quality	Inedible
Air Cell	1/8 inch or less in depth	3/16 inch or less in depth	More than 3/16 inch	Doesn't apply
White	Clear, firm	Clear, may be reasonably firm	Clear, may be weak and watery	Doesn't apply
Yolk	Outline slightly defined	Outline may be fairly well-defined	Outline clearly visible	Doesn't apply
Spots (Blood or meat)	None	None	Blood or meat spots aggregating not more than 1/8 inch in diameter	Blood or meat spots aggregating more than 1/8 inch in diameter

##### Standard for Exterior Quality of Eggs

Factor	AA or A	Grade B	Dirty
Stain	Clean—may show small specks, stains or cage marks that do not detract from general clean appearance of the egg—may show traces of processing oil.	Slight, or moderate localized stains less than 1/32 of shell or scattered stains less than 1/16 of shell.	Prominent stains. Moderate stains covering more than 1/32 if localized and 1/16 of the shell if scattered.
Adhering Dirt or Foreign Material	NONE	NONE	Adhering dirt or foreign material (1.0 mm in area or greater)
Egg Shape	Approximately the usual shape.	Unusual or decidedly misshapen (very long or distorted)	
Shell Texture	May have rough areas and small calcium deposits that do not materially affect shape or strength.	Extremely rough areas that may be faulty in soundness or strength. May have large calcium deposits.	
Ridges	Slight ridges that do not materially affect shape or strength	May have pronounced ridges.	
Shell Thickness	Free from thin spots.	May show pronounced thin spots.	

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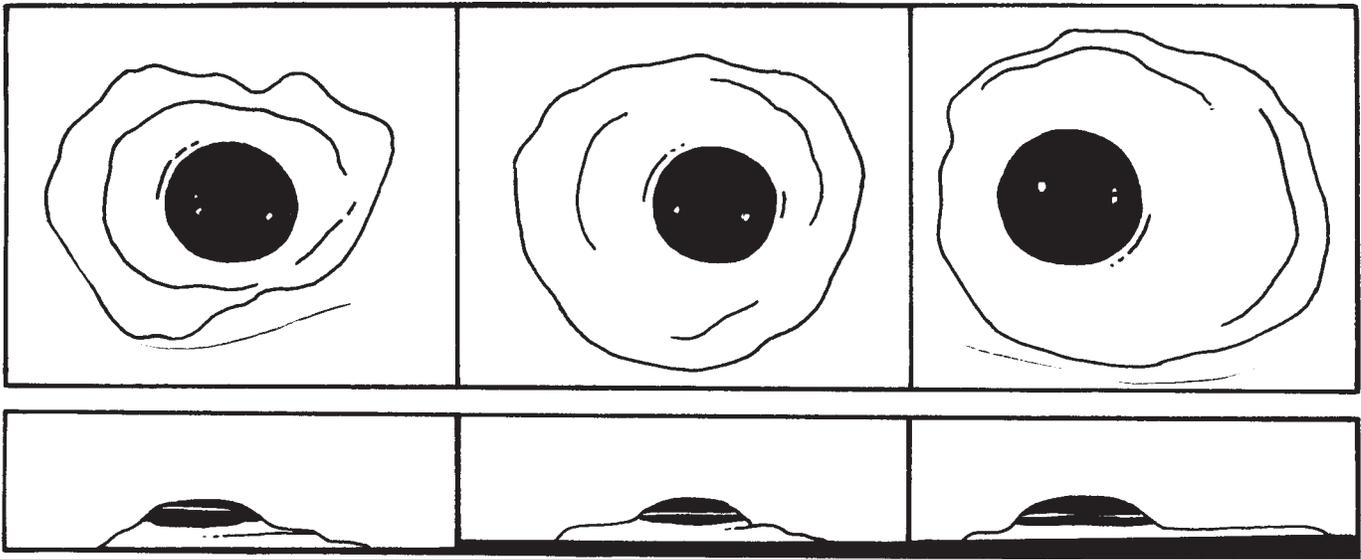
**EGG GRADING**  
**POULTRY, LEVEL III**  
**Member Handout 12, Broken-out Egg Quality Chart**

Specifications for broken-out eggs

AA or Fresh Fancy Quality

A Quality

B Quality



Contestants should learn to assign the proper grade by comparing actual broken-out eggs with the USDA broken-out egg chart. The diameter of the outline of the thick white (top view) may give an indication as to grade; however, the height of the thick albumen (side view) is the most important factor in determining grade. For example, an extra large egg may have a rather large, thick albumen outline and also sufficient height of thick albumen to be Grade AA.

Contestants should evaluate each egg on its own merit and not compare it with other eggs in the class. If you set an incorrect standard, your grade scale could be off, causing you to incorrectly grade several eggs. Learn by comparing to the USDA chart for broken-out eggs.

**Think Back:**

Why are quality factors important in the egg or any other industry? Compare quality with price.

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# Processing Poultry Meat

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The procedures for processing live poultry for meat
- The purposes of each step in the processing procedure

#### **ABOUT THEMSELVES:**

- The importance of meat in their diet
- The importance of sequence and order in life

### Materials Needed:

- Two sets of notecards with processing steps written on them (Leader Guide)
- Rope with 1-inch block of wood tied to one end
- Sharp knife
- Bucket or tank of hot water (135° to 140°F)
- Container full of cold water
- Live bird or model of bird

### ACTIVITY TIME NEEDED: 60 MINUTES

### ACTIVITY:

Home processing of poultry is not difficult and requires a minimum of equipment: a rope with a 1-inch block of wood tied to one end, a sharp knife, a bucket or tank of hot water (135° to 140°F), and a container full of cold or ice water for cooling the carcass.

Let's see if we can identify and place the steps of processing in order. I'm going to hand you a group of cards and I want you to try and arrange them in the order they would be followed.

#### **PREPARATION OF BIRDS**

Birds should be taken off feed eight to 10 hours before slaughter to reduce the amount of material in the digestive tract.

#### **Check for Health of Birds**

Some birds in the flock may show symptoms that raise questions about their health at the time of processing. Do not use birds that have any of the following:

- lumps or spots of any size on the surface of the liver
- any measurable quantity of fluid in the body cavity
- fat in poorly fleshed bird which is orange rather than yellow or white
- any internal organ that is abnormally large

### Leader Notes

Show items needed as you explain.

Hand out cards with processing steps written on them. Let members arrange them in the order they think should be followed. After they have completed this task, begin explaining the steps and have members place another set of cards in the order as presented. At the end of the lesson, have members compare their original list with the steps presented. Note: Best to have two sets of cards for every three to five members.

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## Leader Notes

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These conditions are symptoms of one or more diseases that make the flesh unsuitable for human food.

- breast meat with the same coloration as meat of the thighs and legs
- meat showing white streaks or an area of abnormal enlargement

Birds with defects such as bruises, blisters and skin tears can be processed into wholesome carcasses by removing the damaged tissue.

### **POULTRY PROCESSING PROCEDURE**

The processing procedure is divided into three steps. It is the purpose of this lesson to explain and identify the home dressing process. Therefore, it will be simpler to handle each step separately. If at any time you become ill or uncomfortable, please feel free to lower your head or leave.

Using a live or model bird, demonstrate the procedure as you go through the steps. Step one process necessary to ensure proper bleeding of the carcass.

Point out the parts of the bird as you go through the process and have members try to identify.

#### **Step One: Killing, Scalding, Picking and Singeing**

1. Hang the bird by its feet by using the rope and block. Gently take the head of the bird in one hand with the comb in the palm, and with a very sharp knife cut the jugular veins that come down each side of the neck. Hold the bird's head firmly so it will not scatter blood while bleeding.
2. After the bird is dead, immerse it in hot water (135° to 140°F) for 30 to 40 seconds. Move the birds up and down in the water to help the water penetrate through the feathers to the skin. Adding detergent to the scalding water improves the water penetration and subsequent feather removal.
3. Hang the bird by the rope after scalding. Remove the feathers by rubbing the carcass. The skin will be slightly cooked and tear easily if the water is too hot. Mature chickens and turkeys may have a few hairs. Use an open flame to burn these off.
4. Place the carcass in cool water until all birds are processed. Keeping the carcasses wet also prevents browning of the skin from dehydration.

#### **Step Two: Eviscerating and Washing**

1. When you are ready to eviscerate (removing the internal organs from the carcass), take it out of the cool water and lay on a flat, solid surface. Cut off the feet at the hock joint and remove the head.
2. Eviscerate carcass for use whole, cutup, or split:
  - a. Slit the skin on the top of the neck from the head to the body and remove the windpipe and crop.
  - b. Remove the oil gland at the base of the tail.
  - c. Carefully make an incision around the vent into the body cavity and gently pull the viscera (intestines, gizzard, heart) toward you. Remove the lungs, which are imbedded in the ribs.
  - d. Clean and wash the gizzard, liver and heart. Wash the carcass.

**Step Three: Chilling, Packaging and Storing**

1. Place the carcass in ice water to lower the temperature of the carcass to below 40°F. Chilling retards bacterial decomposition and allows aging of the muscles.
2. Remove the chilled carcass from the ice water; allow carcass to drain before further processing and packaging.
3. Cut up according to preference (split for barbecuing, pieces for frying).
4. Place in freezer bags for long-term storage or the refrigerator for short-term storage (less than four days).

**KANSAS MEAT INSPECTION LAW**

The processing of most poultry in Kansas for sale comes under the Kansas Meat and Poultry Inspection Act. Producers may slaughter and sell directly to household consumers not more than 250 turkeys or 1,000 broilers per year they have raised on their own farm without coming under the inspection law.

**DIALOGUE FOR CRITICAL THINKING:****Share:**

1. If you processed a live bird, what was your general reaction to the procedure? Why?
2. If you used a model, what was your reaction to the proposed procedure? What do you think your reaction would have been to the real procedure? Why?
3. How difficult was it to arrange the processing steps in order? Why?

**Process:**

4. What are the major steps in poultry processing?
5. Why is it important to check the health of the bird before and during processing?

**Generalize:**

6. What did you learn about yourself through this activity?
7. How important is meat in your diet? Why?

**Apply:**

8. How will you act differently in the future as a result of this activity? Why?
9. How important is sequence when doing various activities? (List several different activities and discuss sequence.)

### GOING FURTHER:

- Learn about and compare the processing procedures and methods used in other livestock.
- Prepare and present a talk or demonstration at a 4-H meeting or school classroom.
- Contact a poultry processing plant and find out the procedures they use to process poultry for meat.
- Participate in a poultry judging contest and learn how to grade ready-to-cook poultry
- Have a taste party where you can sample various types of poultry and poultry recipes.

### REFERENCES

*Home Processing of Poultry*, L-769, K-State Research & Extension

#### Author:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed By:

R. Scott Beyer, Extension Specialist, Poultry Science, Kansas State University

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## **PROCESSING OF POULTRY MEAT**

### **POULTRY, LEVEL III**

#### **Leader Guide for Notecards**

##### **Poultry Processing Procedure:**

- Hang the bird by its feet using the rope and block.
- Take the head of the bird in one hand with the comb in the palm, and cut the jugular veins that come down each side of the neck.
- Immerse it in hot water (135° to 140°F) for 30 to 40 seconds.
- Hang the bird by the rope after scalding.
- Remove the feathers by rubbing the carcass.
- Use an open flame to burn (singe) feathers off.
- Place the carcass in cool water.
- Take carcass out of the cool water and lay on a flat, solid surface.
- Cut off the feet at the hock joint and remove the head.
- Slit the skin on the top of the neck from the head to the body and remove the windpipe and crop.
- Remove the oil gland at the base of the tail.
- Make an incision in the body cavity and gently pull the viscera (intestines, gizzard, heart) toward you. Remove the lungs, which are imbedded in the ribs.
- Clean and wash the gizzard, liver and heart. Wash the carcass.
- Place the carcasses in ice water to lower the temperature of the carcasses to below 40°F.
- Remove the chilled carcasses from the ice water; allow carcasses to drain before further processing and packaging.
- Cut up carcass according to preference.
- Place in freezer bags for long-term storage or the refrigerator for short-term storage (less than four days).





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# Grading Ready-to-Cook Poultry

## *Poultry, Level III*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The physical characteristics used in grading ready-to-cook poultry carcasses
- Types of poultry products that are sold in supermarkets

#### **ABOUT THEMSELVES:**

- The importance of grading systems in your life

#### **Materials Needed:**

- Large sheet of paper or chalkboard
- Marking pen
- Member Handout 13, Guide for Estimating the Size of Tears, Cuts and Discolorations
- Member Handout 14, Quality Specifications for Ready-to-Cook Poultry
- Pictures or actual carcasses demonstrating the different quality grades

#### **ACTIVITY TIME NEEDED: 45 MINUTES**

#### **ACTIVITY:**

Poultry carcass quality is determined by the following differences: size and weight, cuts and tears, missing parts, broken and/or disjointed bones.

Now let's take a look at some carcasses and examine them for some of these defects.

#### **CARCASS GRADES:**

Carcasses are graded A, B or C (no grade) quality. Factors used in judging ready-to-cook carcasses in a 4-H poultry judging contest are exposed flesh due to cuts, tears, and trims, broken and disjointed bones, and missing parts. A carcass is graded according to the lowest grade defect found on the carcass.

#### **CUTS, TEARS AND TRIMS:**

Cuts, tears and trims are a result of a miscut with a knife, tearing of the skin during the processing operation, or trimming to remove a defect such as a breast blister. When ready-to-cook poultry is downgraded for the severity of cuts, tears and trims, it is based on the weight of the carcass and the part.

#### **Leader Notes**

Ask members what differences they might see in different poultry carcasses. Write on a large sheet of paper or chalkboard.

Have members break into groups of two or three and examine carcasses for some of the characteristics looked for when grading.

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## Leader Notes

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Cuts, tears or trims must be completely through the skin so the meat, called flesh, can be seen in order to put the carcass in a lower grade. The grade is determined by the amount of exposed flesh, length of cut or amount of skin missing. Sometimes, there may be more than one cut, tear or trim on the same carcass or part. If this is the case, add the length, or amount missing, to determine the grade based on that part only. Each part is graded separately and the grade is determined by the part having the lowest grade on that carcass. Exposed flesh from the continuation of an evisceration cut at the front and back of the breast should not be considered in determining carcass grade.

### **MISSING PARTS:**

Missing parts to be considered when determining quality grade are the wings, tail and part of the back area if it is no wider than the base of the tail. The weight of the carcass is not considered.

### **DISJOINTED OR BROKEN BONES:**

A disjointed bone is where the joint is out of the socket. The bone is still whole, not broken. You will be able to see the end, or knobby part of the joint underneath the skin.

Broken bones occur between the ends of bones. They can be broken so that the bone either does or does not show through the skin. When the broken bone does not come through the skin it is called non-protruding. When the bone penetrates the skin, it is called protruding.

### **Grade A Carcass**

The Grade A carcass is not permitted to have any cuts, tears or missing skin on the breast and legs. On other parts of the carcass a few cuts or tears are allowable depending on the carcass weight. For example, if a carcass weighs between 2 to 6 pounds, there may be up to a 1½ inch area of flesh exposed on the back or wings, compared to only 1 inch for a carcass under 2 pounds.

A Grade A carcass can have only the tail at the base of the body and the wing tips removed.

A Grade A carcass can have one disjointed bone, but no broken bones.

### **Grade B Carcass**

A carcass of Grade B quality may have up to one-third of flesh exposed on each part of the carcass provided the meat yield is not affected. A slight cut into the meat, not more than the thickness of a nickel (1/8 inch) so that the appearance of the part does not look bad, is permitted in Grade B.

A Grade B carcass may be missing the wing up to the second joint, as well as the tail and back less than halfway to the hips.

If a carcass has no more than two disjointed bones or one disjointed and one nonprotruding broken bone, it can be classified as a Grade B carcass.

### Grade C Carcass

A Grade C carcass has more than one-third of the flesh showing on the carcass. If the trim into the meat is more than the width of a nickel ( $\frac{1}{8}$  inch) or the trim definitely alters the appearance of the meat, then it is a Grade C.

In a Grade C carcass the wing may be cut off at the third joint at the juncture of the body. It may also be missing the tail and back, more than halfway to the hip.

More than two disjointed and one or more broken, protruding bones, make a carcass Grade C.

After going through grade specifications, have members grade sample carcasses. Provide Member Handout 13, Guide for Estimating the Size of Tears, Cuts and Discolorations, and Member Handout 14, Quality Specifications for Ready-to-Cook Poultry, to assist members in learning to grade and for their record book.

### DIALOGUE FOR CRITICAL THINKING:

#### Share:

1. What carcass grades did you see most? Why?
2. What was your most difficult aspect of grading poultry carcasses? Why?

#### Process:

3. What are the major factors that determine poultry carcass grades?
4. Why do you think it is important for USDA to have poultry carcass grades?

#### Generalize:

5. What other grading systems are you familiar with?
6. What are the purposes for grading systems? Are they different? Why?

#### Apply:

7. How important do you feel grading systems or standards are in your life? Why?
8. What effect will grading systems and standards have in the future? Will they be needed more? Or less? Why?

### GOING FURTHER:

- Participate in a poultry judging contest.
- Obtain information from USDA regarding quality grades and inspection requirements.
- Prepare an illustrated talk and present to a group.
- Visit a grocery store and identify types of poultry products that are sold.
- Invite a poultry meat inspector to your meeting.

### **REFERENCES:**

*Poultry Judging*, 4-H 92, Nebraska Cooperative Extension

### **Author:**

Adapted from above reference by Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### **Reviewed By:**

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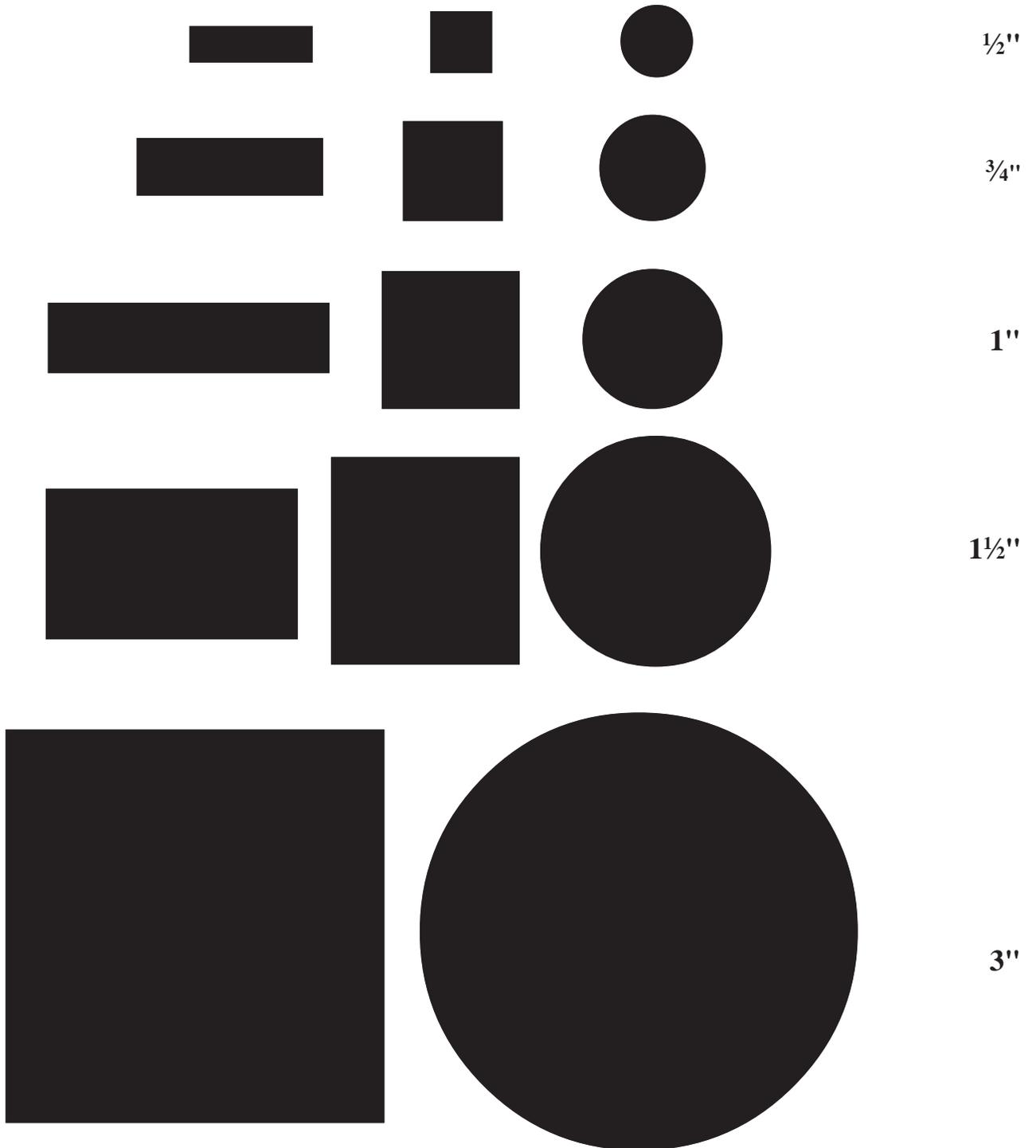
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**GRADING READY-TO-COOK POULTRY**

**POULTRY, LEVEL III**

**Member Handout 13, Guide for Estimating Size of Tears, Cuts and Discolorations**



## GRADING READY-TO-COOK POULTRY

### POULTRY, LEVEL III

#### Member Handout 14, Quality Specifications for Ready-to-Cook Poultry

Factor		A Quality		B Quality		C Quality
Exposed Flesh Carcass Weight		Breast <sup>2</sup> & Legs	Elsewhere <sup>1</sup>	Breast & Legs	Elsewhere	
Min.	Max.	None	1"	1/3 of flesh		NO LIMIT
None	2 lbs	None	1 1/2"	exposed on each		
Over 2 lbs	6 lbs	None	2"	part of carcass		
Over 6 lbs	16 lbs	None	3"	provided meat yield		
Over 16 lbs	None			not appreciably affected		
Disjointed bones		1 disjointed		2 disjointed and no broken or 1 disjointed		NO LIMIT
Broken bones		None		and 1 nonprotruding broken		NO LIMIT
Missing parts		Wing tips and/or tail removed at the base		Wing(s) to 2nd joint. Back area not wider than base of tail and extending halfway between base of tail and hip joints.		Entire wing(s) Back area not wider than base of tail extending to area between hip joints.

<sup>1</sup>Longest length for a cut and total area for tears and missing skin based on the whole part.

<sup>2</sup>For purposes of definition, the parts of the carcass shall be each wing, leg, entire breast and entire back.



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# Integration and Specialization in the Poultry Industry

*Poultry, Level III*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- Nine segments of the poultry industry
- A purpose for each of the nine industry segments

### ABOUT THEMSELVES:

- Their feelings about the value of integration in the industry
- Their feelings about their interest in various industry segments as possible careers.

## Materials Needed:

- Member Handout 15, Typical Integrated Broiler Firm

**ACTIVITY TIME NEEDED:** 30 MINUTES

## ACTIVITY:

## Leader Notes

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The production and marketing of eggs and poultry meat in the United States is a highly specialized industry. In addition to the producers that care for the birds, the firms that manufacturer feed, and firms that process and market eggs and meat, a number of highly specialized poultry businesses are vital to the success of the poultry industry. The industry is highly **integrated**, which means that most phases of production and marketing are controlled by one firm. Examples of major specialized poultry businesses are:

### Hatching Egg Business

Breeder flocks are kept to supply hatching eggs for hatcheries. The seed or parent stock is usually obtained from the foundation breeder. Management of breeders in most respects is similar to that for an egg production or market turkey flock. However, it costs more to produce hatching eggs than market eggs because breeders lay fewer eggs, the breeders have to be tested for various egg-borne diseases, and males require more feed and space than females.

Control of body weight of breeders is important. Birds, particularly meat-type stocks, have a tendency to put on excess weight in the form of fat. Overweight breeders consume more feed and lay fewer eggs than lean birds. Some type of feed restriction is used to prevent overweight birds.

Not all potential breeders are good enough to be breeders. Particular emphasis is placed on defects that will be passed on to the offspring and those that will have negative effects on performance. Examples of serious defects are a lack of vigor, deformed legs and back, crossed beaks, and evidence of disease.

### **Foundation Breeder Industry**

These firms develop the parent stocks that are used to produce the chicks and poults that are used in the commercial production industry. Because of the large financial investment that is required to develop new lines, this industry is controlled by a few major breeders.

### **Started Pullet Growers**

Many commercial egg producers rely on other firms to grow their replacement pullets. The reasons for this is the lack of growing facilities, labor and experience, disease problems, and a desire to concentrate on egg production. A common practice is for the pullet grower and egg producer to have a written contract which specifies such things as sale price, and feeding, lighting, vaccination and debeaking programs. Started pullets are usually delivered to the egg producer between 18 and 20 weeks of age.

### **Hatchery Industry**

Hatcheries are firms that convert fertile hatching eggs into day-old poultry in machines called incubators. Because the main source of income for a hatchery is the sale of day-old or started birds, its success is very dependent on the fertility and hatchability of the eggs. Hatcheries that sell most of their birds to owners of small flocks usually hatch only during the spring months. Hatcheries that supply birds to commercial producers hatch throughout the year. Major factors that affect hatchability of hatching eggs are fertility, proper handling and storage of eggs, nutrition of the breeders, and proper incubation of the eggs. A specialized business within the hatchery industry is crews that artificially inseminate commercial turkey breeder flocks.

### **Feed Industry**

Poultry is a major consumer of manufactured feed. For example, a laying hen will consume 75 to 80 pounds of feed a year. The quality and cost of feed is very important because feed is the largest cost in producing eggs and meat. A feed manufacturer purchases feed ingredients, such as grain, soybean meal, vitamins and minerals, and combines them to make a complete feed for the birds. The amounts of each ingredient used in a feed depends on the age and type of poultry that will be fed.

### **Pharmaceutical (Drug) Industry**

Even under the best of management, drugs are needed. Drugs promote growth, and treat or prevent disease. Examples of drugs for poultry are antibiotics, chemobiotics, wormers and insecticides. The use of drugs in poultry production is closely supervised by the Food and Drug Administration. This agency requires that any drug that is used on poultry must not pose a threat to human health.

### **Communication Industry**

Publishers of journals, magazines and newspapers serve the industry by providing current information to the industry. Can you name a few of the more prestigious journals?

### **Loading Crews**

These crews serve a very important function in the poultry industry by loading live birds for processing.

### **Transportation Industry**

In most cases, eggs and poultry are not grown close to major population centers or major sources of feed ingredients. Transportation is needed to transport feed ingredients to the feed mill, live birds and eggs to the processing plant, the finished products to the food stores, and feed and other supplies to the farm.

### **Housing and Equipment Industry**

Most poultry is housed in well-constructed, highly automated buildings. Many of these buildings are as well-constructed, lighted and ventilated as your home. These features provide both the birds and caretakers a good environment in which to live and work. These houses are usually well insulated, ventilated by fans, and equipped with lights, automatic feeders, waterers, egg collection belts, and manure disposal equipment. There are firms that specialize in constructing and equipping poultry houses.

Have individual or groups of members select a segment of the industry for further study. They should interview someone in that segment and then report the findings to the total group. If the group is interested, each segment could be studied at a separate meeting and include a guest speaker or discussion leader.

## **DIALOGUE FOR CRITICAL THINKING:**

### **Share:**

1. What segments of the poultry industry are you most interested in? Why?
2. Which segment of the poultry industry do you think is the most complex or hard to understand? Why?

### **Process:**

3. What is the most significant aspect of the poultry industry?
4. What are the advantages and the disadvantages of the poultry industry? Why?

### **Generalize:**

5. Which segments of the poultry industry do you feel have the best career possibilities? Why?
6. What personal characteristics or interests do you feel would be needed to succeed in a particular segment of the poultry industry? Why?

### **Apply:**

7. How do poultry careers compare to livestock careers?
8. If you were to study other industries, what would you do differently? Why?

### **GOING FURTHER:**

- Ask poultry businesses for information on careers.
- Check out more specialized careers such as poultry artificial inseminators, or poultry veterinarians.

### **REFERENCES:**

#### **Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

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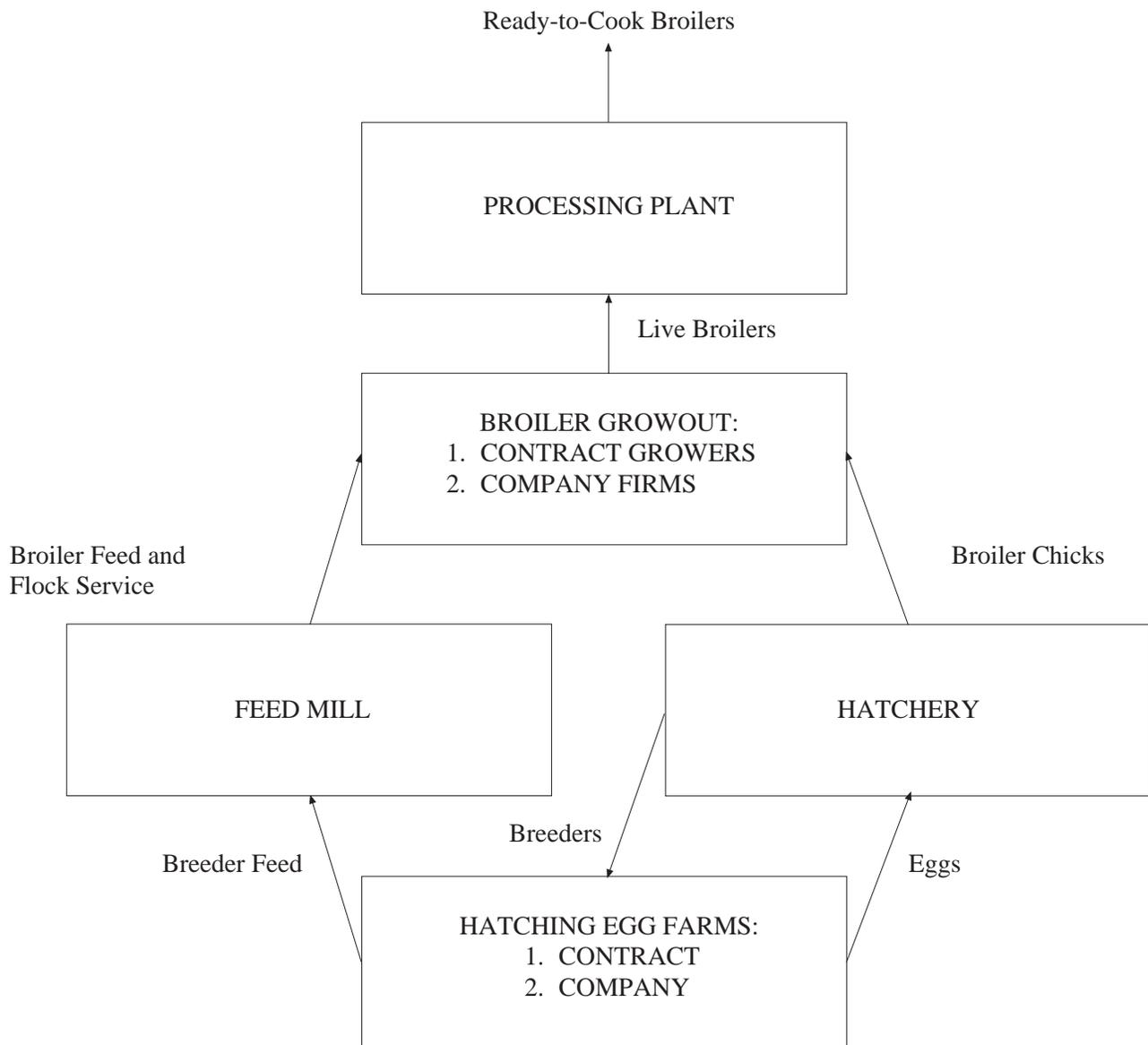
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**INTEGRATION AND SPECIALIZATION IN THE POULTRY INDUSTRY**  
**POULTRY, LEVEL III**  
**Member Handout 15, Typical Integrated Broiler Firm**



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**Think Back:**

What standards and efficiencies do you see in the meat production portion of the poultry industry? Are they different from other food industries? Why? Why not?

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# Kansas 4-H Poultry Leader Notebook

## *Level IV*

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# Advancing by Setting Long-Term Goals

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Setting goals

#### **ABOUT THEMSELVES:**

- The importance of setting goals

#### **MATERIALS NEEDED:**

- Poultry Member Guide and Annual Report (MG-26)
- Activity Sheet 1, Preparing Long-Term Goals

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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Because of your involvement and achievements in past poultry projects, you will now be helping other project members by sharing the information and knowledge you have gained about poultry.

As a junior leader, you also will be reviewing your own goals.

Your progress throughout Level IV is an important part of your poultry project. Sometimes, setting long-term goals is difficult and, therefore, we do not do it. But in Level IV, we have made places for you to look at your progress.

Setting long-term goals does not need to be intense or elaborate. Rather, it should be simple and to the point. If you take time to review your long-term goals, you will have a better chance of reaching those goals.

Goals can be long-term or short-term. When using the Poultry Member Guide and Annual Report for Level IV, let's make both goals long-term—something you plan to do in two to five years.

Many of the things you have been learning in your poultry projects are skills that are transferable to long-term goals, such as obtaining more education, getting a job, winning a scholarship or even pursuing a career.

Pass out Activity Sheet 1, Preparing Long-Term Goals, and fill in the blanks.

Now that you have completed the activity sheet, let's fill out the Poultry Member Guide and Annual Report using these two long-term goals.

Complete MAP STEPS one to seven.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What were your two goals?
2. What did you like most about this activity?

#### **Process:**

3. Why is it important to review your long-term goals?
4. What skills do you have that you can use in other projects, activities or situations?

#### **Generalize:**

5. What did you learn about yourself from this activity?

#### **Apply:**

6. How will you apply what you have learned to other situations?

### **GOING FURTHER:**

- Develop a job résumé.
- Discuss developing a personal portfolio of your skills with a school counselor.

### **REFERENCES:**

#### **Author:**

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**ADVANCING BY SETTING LONG-TERM GOALS**  
**POULTRY, LEVEL IV**  
**Activity Sheet 1, Preparing Long-Term Goals**

Long-term goals define your future. Select two of the following long-term goals you might work on in Level IV.

CHECK TWO (of your choice)

\_\_\_\_\_ acquire more education

\_\_\_\_\_ get a job

\_\_\_\_\_ win a scholarship

\_\_\_\_\_ select a career path

\_\_\_\_\_ other \_\_\_\_\_

\_\_\_\_\_ other \_\_\_\_\_

Now take one of these long-term goals and answer the following questions.  
One of my long-term goals is to:

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I hope to eventually use this long-term goal. I plan to reach this goal by:

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To reach this long-term goal I will use my abilities of:

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To reach this long-term goal I will need to improve on:

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When I reach my goal in the future, I will know it has been met by:

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# Game Bird Production

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Specific management techniques in order to raise selected game birds
- Marketing strategies for specific species
- Specialty markets available for desired species
- Hunting and recreation available for desired species

#### **ABOUT THEMSELVES:**

- Their feelings about hunting (killing or harvesting) nature's game birds
- Their feelings on operating hunting reserves for profit
- Their opinion on raising game birds for specialty food markets

### Materials Needed:

**ACTIVITY TIME NEEDED:** 60 TO 120 MINUTES

### ACTIVITY:

### Leader Notes

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There are several reasons for raising game birds. Some people raise game birds for their beauty, particularly the more colorful and unusual species. Some states encourage youth to raise game birds such as ring-necked pheasants for release, to improve the natural population. Also, game birds are raised as a business enterprise. Examples are raising game birds for release on private and/or public hunting areas, or for processing and sale as a gourmet food item.

The species of game birds that can be successfully grown under domesticated conditions are bobwhite quail, ring-necked pheasants, chukar or Hungarian partridges, wild turkeys and mallard ducks. The ring-necked pheasant and partridge were successfully introduced into the United States from other countries because they were placed in habitats similar to their native countries. Game birds are grown much like chickens and turkeys, except they require enclosed pens so they can't fly away.

Except for mallard ducks, the main food of game birds is weed seeds, berries, insects and various forms of green vegetation. Where water is not present, upland game birds obtain their necessary moisture by eating various types of succulent green plants or insects.

The **bobwhite quail** is a very popular game bird. It is found in most areas of Kansas, particularly the eastern half of the state. Its exploding flush and fast darting flight make it a challenge to hunters. The bobwhite is mainly a farmland bird preferring a combination of cultivated fields, woodlots, brush and weed patches for its habitat. Bobwhite quail usually raise one

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## Leader Notes

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brood (or family) per summer. The brood remains together through the summer and sometimes joins other broods or individuals to form coveys in the fall. Bobwhite quail weigh 6 to 8 ounces.

Other species of quail found in the United States are the **California** or valley, **mountain**, **Gambel's** or desert, **scaled** or blue, and **Mearn's**. The **Japanese**, coturnix or Pharaoh's quail, is native to Europe and Asia and dates back to the ancient civilizations of those countries. Coturnix quail are easy to raise because they are hardy, easy to handle and require simple equipment. They have a short reproductive cycle, and may lay eggs when only 35 days old. The adult birds weigh between 4 to 5 ounces. Attempts to establish the species in the wild have not been successful.

The **chukar** or rock partridge is found in the mountainous states which have an arid mountainous habitat similar to the chukar's native habitat of Europe and Asia. Chukars weigh between 1 and 1¼ pounds. The **gray or Hungarian** partridge, sometimes referred to as the "Hun," is found mainly on farmed prairies in the Northern United States and Southern Canada.

The **ring-necked pheasant** is considered by many people to be the king of game birds, probably because of its size and the beautiful feathers of the male. Farmed prairies are the bird's ideal habitat. Adult pheasants weigh between 2 and 3 pounds.

The **mallard** duck is the most popular species of waterfowl and the easiest to raise and propagate in captivity. In addition to its ability to adapt to pen conditions, the adult mallard is relatively free of disease and requires a minimum of shelter in the most severe weather. Their acceptance of pen conditions is primarily controlled by the availability of food and water. Mallards are raised primarily for farm ponds.

The **wild turkey** is the largest upland game bird in the United States. An adult gobbler will sometimes weigh more than 20 pounds.

Turkeys were originally found throughout the United States and Mexico. There are six races of wild turkeys with the Eastern being the most common. Our present domesticated varieties of turkeys originated from the Mexican race. Spanish explorers took the Mexican race back to Europe. This stock gave rise to several varieties, which were brought to the continent by the settlers. Present-day varieties such as the Broad Breast Bronze were developed from crosses of these varieties and the Eastern wild turkey.

Wild turkeys have been successfully introduced into Kansas and other parts of the United States. Preferred habitat for the turkey is wooded areas with scattered openings. Turkeys are polygamous (one male mating with several females) and raise only one brood of young (poults) each year.

Your first decision is to choose a specific bird to study for possible production.

After you have chosen a species, consider gathering information in these categories:

1. Techniques unique to raising and management of selected bird
2. Marketing strategies
  - Food markets
  - Hunting and recreation possibilities

Consider the following activities for your species:

1. Visit a game bird reserve.
2. Do a grocery store search and list all game bird food items available.
3. Collect breed, Research and Extension or other management-type bulletins.
4. Check for slide sets, videos, or movies from Research and Extension or public libraries.
5. Visit university or private research facilities.
6. Have a discussion with friends or club members on the importance of game birds for recreation.
7. Research specialty markets that might be available.
8. Have a discussion on the pros and cons of hunting and animal welfare issues.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What game bird did you study? Why?
2. What was the most unusual or different situation you encountered? Why?

#### **Process:**

3. Which game birds are easiest to raise? Why?
4. What problems occurred in the species chosen by your group? Why?

#### **Generalize:**

5. What is your position or thoughts on hunting game birds? Discuss the extremes in thinking as to whether hunting is harvesting to assist the balance of nature, or killing a valuable life, or simply a sport.
6. What are your feelings about raising game birds? Is it a business? Hobby? Or raising a food commodity?

Divide members into groups of two to four and let them select a game bird to study. Each group could plan one activity about its chosen bird to share with the entire group. This could possibly take several meetings.

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## Leader Notes

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### Apply:

7. How will the issues raised by this activity be useful in the future?
8. What would you do differently if you studied this topic again? Why?

### GOING FURTHER:

- Give a presentation to civic groups on a game bird issue or topic.
- Invite a wildlife specialist or game warden to your meeting.
- Lead a public forum on one of these issues pertinent to your area.

### REFERENCES:

*Raising Game Birds*, Leaflet 21046, AHR Publications, University of California, 6701 San Pablo Ave, Oakland, California, 94608 (\$2.50)  
*Bobwhite Quail Production*, Kansas State University Animal Sciences and Industry, Call Hall, Manhattan, Kansas, 66506-1600

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# ABCs of Poultry Genetics

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Five genetic terms and their definitions
- To identify and define three breeding systems
- To identify and define five selection and culling methods

#### **ABOUT THEMSELVES:**

- Genetic principles important to people
- How genetics might affect their life

#### **Materials Needed:**

- Pictures of several different breeds and varieties of poultry
- Paper and pencils
- Chalkboard
- Member Handout 1, Inheritance Examples

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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It is important for those engaged in poultry raising to have a basic understanding of the principles of poultry breeding. Knowing these principles will aid in understanding and choosing the right type, strain, breed and variety of poultry.

Since wild fowl were first domesticated, there have been many changes through selective breeding programs. Most likely, chickens were first selected on their fighting ability. Then in the late 1800s, breeders placed major emphasis on the appearance of the birds, such as comb type and feather color. Many of the American breeds and varieties of chickens were developed during this era. In recent years, breeders have placed major emphasis on selection for efficient egg and meat production.

What a bird looks like and how it performs are influenced by the genetic traits it inherits from its parents and the environment in which it lives.

**Chromosomes** are the carriers of the **genes** that are the basic units of inheritance. Each species of animal has a definite number of chromosomes. The chicken has 39 pairs of chromosomes. Genetic traits may be **dominant** or **recessive**. A dominant gene is one that exerts its influence over its recessive counterpart. Dominance may vary from partial to complete.

Using pictures or illustrations, have youth discuss differences in the physical appearance of various breeds and varieties of poultry.

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## Leader Notes

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Using Example 1 on Member Handout 1, Inheritance Examples, illustrate the inheritance of comb type in chickens. Put various genotypes on the chalkboard and have youth determine the various genotypes and phenotypes of the progeny. Genotype refers to the actual gene makeup, while phenotype refers to the physical appearance.

The genetic traits which are inherited by an individual bird may express themselves in two ways, **physically** or **qualitatively** (those we can see) such as body shape, comb type, and feather color, and **physiologically** or **quantitatively** (those we can't see) such as egg production, growth rate and broodiness.

**Qualitative** traits are clearly expressed in the physical appearance of the bird and are usually controlled by one or two gene pairs. The environment has little influence on the expression of qualitative traits. Following are some important qualitative traits of chickens:

1. **Feather Color.** White- or light-colored feathering is very important in the breeding of meat-type poultry because they look cleaner when processed than birds with dark-colored feathers. Mating a dominant white bird with a colored female will produce predominantly white-feathered offspring.
2. **Skin Color.** Most breeds and varieties of chickens have either white or yellow-colored skin. Since most breeds developed in the United States have yellow skin, yellow-skinned broilers are preferred in most markets.
3. **Sex Determination.** Of the 39 pairs of chicken chromosomes, 38 have similar size and shape within pairs and are called autosomes. The other pair contains similar members in the male, (ZZ) chromosomes, and one different member in the female, (ZW) chromosomes. The Z chromosome carries genes just like the autosomes, but the W chromosome carries few or no genes and appears to function primarily in sex determination. Thus, the female bird determines the sex of the offspring.

Using Example 2 on Member Handout 1, Inheritance Examples, illustrate how the gene for barring can be used to sex day-old chicks. Have youth discuss why sexing day-old chicks is desirable. Have youth make the reverse cross and show the various genotypes and phenotypes.

The lack of a second Z sex chromosome in the female is of some economic importance. Certain traits, such as rate of feathering and some plumage colors (barred, silver, gold), are carried on the Z sex chromosome. These genes are said to be **sex-linked**, and when used in a proper cross can be used to determine the sex of day-old chicks by differences in the appearance of their feathers.

Variability of **quantitative** traits among individuals is measured numerically, such as number of eggs laid per hen or average body weight. Quantitative traits are usually influenced by several gene pairs. If selection for one trait indirectly improves another trait, the traits have a **positive genetic correlation**. For example, selection for small body size in egg-type chickens improves feed efficiency. A **negative genetic correlation** is when improvement in one trait results in deterioration of another trait. Using the previous example, selection for smaller body size would result in smaller eggs.

Performance of poultry is a combination of the influences of **heredity** and the **environment**. **Heritability** is the sum of the genetic forces that are expressed through a particular gene or combination of genes. The environ-

ment is the sum of the nongenetic forces that influence gene expression. Traits with low heritability are greatly influenced by the environment. Examples are fertility and disease resistance. Examples of traits with high heritability are shell color and egg weight.

**Selection** for egg production and meat production is very complex since it involves continuous selection for improvement in many factors. The primary traits affecting egg production are age at sexual maturity, rate of lay, livability, body size, egg size, egg quality and shell color. Major traits affecting meat production are rate of growth, body conformation and fleshing, amount and distribution of fat, feathering, feed conversion and carcass grade and yield.

Poultry breeders use different **breeding systems** to improve the performance of poultry. Most of the systems involve some type of crossing.

1. **Purebreeds.** Mating birds of the same breed or variety. Maintenance of purebred lines is essential to supply stocks for other breeding systems.
2. **Inbreeding.** This involves mating closely related individuals such as brother and sister. Its purpose is to expose adverse recessive genes. Inbreeding adversely affects such traits as livability, fertility and hatchability.
3. **Crossing.** The purpose of crossing is to increase hybrid vigor. **Crossbreeding** involves mating different breeds or varieties such as a Rhode Island Red cockerel and a White Leghorn pullet. **Incrossing** involves crossing two inbred lines of the same breed or variety. **Strain crossing** is the mating of two distinct, non-inbred strains of the same breed or variety. Most commercial chickens and turkeys are produced by strain crossing.

**Culling** the flock is a very important management tool. It involves the removal of undesirable birds from the flock. Three basic reasons for culling are to salvage the poor producers while they still have some value, to improve the production efficiency of the flock by removal of the loafers, and to prevent the spread of disease. Culling is most commonly practiced in small flocks.

**Selection** refers to selecting candidates for the breeding flock. Both physical appearance and performance records are used in selection of potential breeders. **Mass selection** is based on selection of desirable individuals without regard to the productivity of their relatives. **Family selection** involves selecting breeders on the basis of their ancestors' performance, such as pedigree selection, sibs' performance, progeny's performance, or a combination of these. **Index selection** is based on a combination of information from various sources and usually involves individual plus family selection.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. When you mapped various genetic matings, what trends or unusual results did you discover?
2. What aspects of genetics are easy or hard to understand?

#### **Process:**

3. What is the difference between genotype and phenotype?
4. What is the difference between qualitative and quantitative traits?
5. What are the three basic reasons for culling?

#### **Generalize:**

6. What did you learn about yourself during this activity?
7. Which of these genetic principles are important in human genetics? Why? Give examples.

#### **Apply:**

8. How do you think your understanding of genetics will help you in the future? Why?

### **GOING FURTHER:**

1. Give a presentation about simple genetics to a group.
2. Visit a poultry breeder and discuss mating systems.
3. Visit a poultry research facility to see what genetic research is being done.

### **REFERENCES:**

*Poultry Science Manual*, Department of Animal Sciences and Industry,  
Kansas State University.  
*Poultry Science*, Ensminger.

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**ABCS OF POULTRY GENETICS**  
**POULTRY, LEVEL IV**  
**Member Handout 1, Inheritance Examples**

Example 1. Inheritance of comb type in chickens.

<b>Genotypes and phenotypes of parents</b>	<b>Genotypes and phenotypes of progeny</b>
RR (rose) × RR (rose)	RR (rose)*
RR (rose) × rr (single)	Rr (rose) RR (rose)
Rr (rose) × Rr (rose)	Rr (rose) rr (single) RR (rose)
RR (rose) × Rr (rose)	Rr (rose) RR (rose)
Rr (rose) × rr (single)	Rr (rose) rr (single)
rr (single) × rr (single)	rr (single)

\* Rose comb is dominant to single comb.

Example 2. Illustration of sex-linked genes in chickens, a Rhode Island cockerel mated to a Barred Rock pullet.

<b>Genotypes and phenotypes of parents</b>	<b>Genotypes and phenotypes of progeny</b>
Rhode Island cockerel × Barred Rock pullet bb (nonbarred) × BW (barred)	Bb (barred)* - all cockerels bW (nonbarred) - all pullets

\* Barring is dominant to nonbarring.



# Chick Embryo Development

*Poultry, Level IV*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- How to create an egg window in an incubating egg
- To recognize the heart pulsations in the young chick embryo
- Stages of embryonic development

### ABOUT THEMSELVES:

- The embryonic development of other animals compared to a chick
- Their feelings about observing embryonic development

## Materials Needed:

- Fertile chicken eggs that have been incubated 48 hours
- Tweezers
- Scissors
- Cellophane tape or plastic wrap
- Member Handout 2, Important Events in Embryonic Development
- Member Handout 3, Embryo Development at 5, 10, 15 and 20 Days

**ACTIVITY TIME NEEDED:** 60 MINUTES

## ACTIVITY:

## Leader Notes

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One of the greatest miracles of nature is the rapid transformation of a seemingly lifeless egg into a new, living organism, the chick. The developing chick embryo offers a rare opportunity for you to study the various stages of development in its embryonic growth, such as the early heartbeat or the embryo exercising back and forth in its small encasement.

Since the embryo actually starts to develop with the formation of the egg within the hen's body, it's important to understand the formation of the egg to fully understand embryonic development.

Refer to Parts of an Egg illustration, Egg Grading, Level III.

Fertilization takes place as the ovum enters the funnel, or infundibulum, if viable sperm are present. Many sperm contact the germinal disc on the ovum, or yolk, but only one unites with the female germ cell. Thus, fertilization occurs about 24 hours before the egg is laid. Since the fertilized germinal disc or blastoderm spends about 24 hours in the warmth of the hen's body (107°F) while the egg is being formed, a number of cell divisions (4,000 to 6,000) take place before the egg is laid.

If, after the egg is laid, its temperature drops below 80°F, development ceases. Holding fertile eggs at temperatures above 80°F prior to incubation causes slow embryonic growth resulting in a weak embryo and ultimately a poor hatch. Thus, it is necessary to store hatching eggs at temperatures of 60° to 65°F prior to incubation.

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## Leader Notes

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The successful structural development of the embryo from a microscopic spot to a structure filling the entire shell is dependent upon the proper functioning of the processes of respiration, excretion, metabolism and protection. In observing the living embryo, you should be familiar with the special temporary organs, or embryonic membranes formed within the egg to fulfill these functions. These organs are the **yolk sac**, **amnion** and **allantois**.

The **yolk sac** is a vascular membrane growing over the surface of the yolk. Its function is to supply food material to both the developing embryo and the chick the first few hours after it is hatched.

The **amnion** encases the embryo in a colorless fluid and provides protection from mechanical shock and permits the developing embryo to exercise.

The **allantois** serves as a respiratory organ and a reservoir for excreta. It absorbs albumen, which serves as a nutrient, and calcium for the structural needs of the embryo.

Pass out Member Handout 2, Important Events in Embryonic Development, and Member Handout 3, Embryo Development at 5, 10, 15 and 20 Days. Discuss the events and compare to the diagrams.

Have members divide into groups and give each group a 48-hour incubated egg. As you read instructions, have groups prepare the eggs.

### Activity—Study the Beating Heart

1. By the time the chicken embryo has incubated 48 hours, the first sign of life, the exposed beating heart, is evident to the naked eye.
2. Carefully crack the blunt or large end of the shell with the heavy end of the tweezers. Flake away a few small pieces of shell. Using the scissors, cut the shell as far down as the inner shell membrane, which is the opaque (white) membrane laying on top of the liquid contents of the egg. The outer shell membrane will have been removed with the shell.
3. There may be blood vessels very near to the inner shell membrane. This membrane must be removed carefully in order to not break any of the blood vessels and cause a hemorrhage.
4. As soon as the membrane is successfully removed, you will see a mass of blood vessels covering the yolk and the tiny heart can be seen pulsating with life.
5. If the egg is maintained in the upright position, the heart will continue to beat for several hours even at room temperature.
6. If the opening is covered with plastic wrap or cellophane tape and returned to the incubator in the upright position, the heart may continue to pulsate for some time, perhaps as much as a day.

For all practical purposes, the egg will not hatch after this opening is made as the respiratory balance has been altered. Also, the egg can no longer be turned to facilitate embryonic growth. Experience has indicated, however, that growth may continue for some days. The observer may feel that because the heart can no longer be seen, the embryo may have died, but

you should remember that the heart itself is enclosed within the body cavity approximately 72 hours after incubation is started, so it will no longer be visible.

**DIALOGUE FOR CRITICAL THINKING:****Share:**

1. What happened when you cut the window in the egg shell?
2. What was the most difficult aspect of cutting the window in the egg? Why?

**Process:**

3. When does fertilization of the egg take place?
4. Why is there normally no cell growth in the egg between the time it's laid and when it's put into the incubator?

**Generalize:**

5. What did you learn about yourself by observing chick embryonic development?
6. What are the major differences between chick embryo development and embryo development in other animal species?

**Apply:**

7. How will the issues raised by this activity be useful in the future?

**GOING FURTHER:**

- Prepare and present a talk or demonstration on embryo development.
- Study different stages of embryonic development by examining eggs from different incubation times.
- Study different incubation periods from different species/breeds.

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## Leader Notes

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### REFERENCES:

*Experiments with Chick Embryos*, Kansas State University Poultry Science Manual

### Author:

Adapted from above reference by Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

### Think Back:

How important is genetics and embryonic development in the production of game birds as compared to chickens?

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# CHICK EMBRYO DEVELOPMENT

## POULTRY, LEVEL IV

### Member Handout 2, Important Events in Embryonic Development

#### Before Egg Laying

- Fertilization
- Division and growth of living cells
- Segregation of cells into groups of special function

#### Between Laying and Incubation

- No growth; stage of inactive embryonic life

#### During Incubation

- First Day:** 16 hours—First sign of resemblance to a chick embryo.  
18 hours—Appearance of alimentary canal.  
20 hours—Appearance of vertebral column  
21 hours—Beginning of formation of nervous system  
22 hours—Beginning of formation of head  
23 hours—Appearance of blood islands—vitelline circulation  
24 hours—Beginning of formation of eye
- Second Day:** 25 hours—Beginning of formation of heart  
35 hours—Beginning of formation of ear  
42 hours—Heart begins to beat
- Third Day:** 50 hours—Beginning of formation of amnion  
60 hours—Beginning of formation of nose  
62 hours—Beginning of formation of legs  
64 hours—Beginning of formation of wings  
70 hours—Beginning of formation of allantois
- Fourth Day:** Beginning of formation of tongue
- Fifth Day:** Beginning of formation of reproductive organs and differentiation of sex
- Sixth Day:** Beginning of formation of beak and eggtooth.
- Eighth Day:** Beginning of formation of feathers.
- 10th Day:** Beginning of hardening of beak.
- 13th Day:** Appearance of scales and claws.
- 14th Day:** Embryo turns its head toward the blunt end of egg.
- 16th Day:** Scales, claws, and beak becoming firm and horny.
- 17th Day:** Beak turns toward air cell.
- 19th Day:** Yolk sac begins to enter body cavity.
- 20th Day:** Yolk sac completely drawn into body cavity; embryo occupies practically all the space within the egg except the air cell.
- 21st Day:** Hatching of chick.

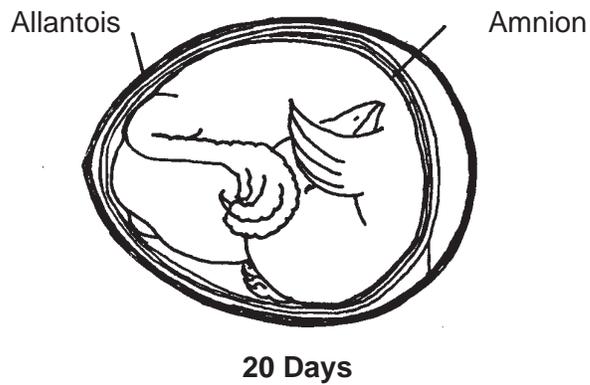
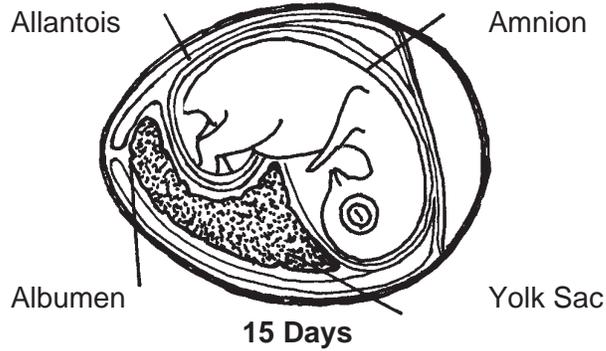
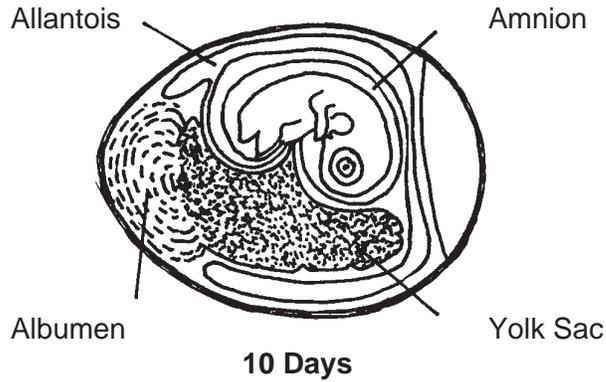
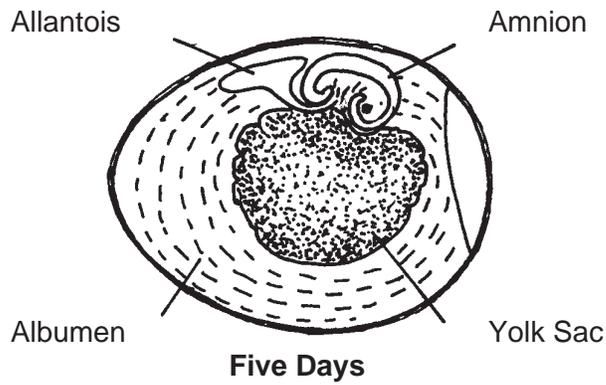
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# CHICK EMBRYO DEVELOPMENT

## POULTRY, LEVEL IV

### Member Handout 3, Embryo Development at 5, 10, 15 and 20 Days





# Chick Coloring to Observe Feather Growth

*Poultry, Level IV*

## What Members Will Learn . . .

### ABOUT THE PROJECT:

- To illustrate plumage development
- To demonstrate the rate of growth of feathers in the chick

### ABOUT THEMSELVES:

- Their feelings about the first impression they make on others
- The value they place on physical appearance

## Materials Needed:

- Fertile chicken eggs—white varieties (White Leghorns, White Plymouth Rocks, White Wyandottes, etc.)
- Incubator
- Egg candler
- Small drill, sharp probe or knife with a good point
- Hypodermic syringe of 1 or 2 cc capacity
- 22-gauge needles, ½-inch long
- Vegetable dyes
- Paraffin, collodion, or cellophane tape
- Tincture of merthiolate or 95 percent alcohol solution
- Member Handout 4, Cross section of 11-day-old Embryo Showing Site of Dye Injection

**ACTIVITY TIME NEEDED:** 45 MINUTES

## ACTIVITY:

## Leader Notes

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Colored chicks are an excellent attraction in any chick display. There are two ways to color chicks: one is by dipping the chicks in a warm dye solution; and the other is the procedure we will use today by injecting dye into the embryo prior to hatching. Coloring chicks is a method which provides an opportunity for you to study early feather growth. Juvenile plumage will replace the colored down in about two weeks. As this happens, the dyed background amid new growing feathers provides a constantly changing pattern.

### Procedure:

1. The eggs should be incubated for 15 days.
2. The eggs should be candled, although this is not absolutely essential. If the eggs are not candled and all eggs are injected with the dye, some of the eggs may have been infertile or the embryos may have died at an early age and, thus, will not hatch.

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## Leader Notes

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Break members into groups of two or three. Give each group an egg, syringe, etc., to work on the eggs as you read the instructions.

3. Harmless vegetable dyes, such as food coloring dyes sold in grocery stores, work satisfactorily. Red, green, and blue usually give the cleanest and most distinct results. Coloring by injection of these dyes will not adversely affect the chick in any way.

Sterilize the small end of each egg by wiping it with the merthiolate or alcohol solution. Allow eggs to dry. Place the needle on the hypodermic syringe and draw approximately 1 cc of dye solution into the syringe for each egg to be injected. The amount of liquid is not critical as long as  $\frac{1}{2}$  to 1 cc is used for each egg.

4. Drill a small hole, large enough for the needle on the syringe, in the small or sharper end of the egg shell.
5. Insert the needle into the egg being careful not to stick it into the embryo. Usually  $\frac{1}{4}$  to  $\frac{1}{2}$ -inch penetration into the egg will be sufficient to go into the extra-embryonic membranes. The tissues of the embryo have developed sufficiently that one will be able to "feel" the needle touch the embryo. If this happens, withdraw the needle slightly before injecting the dye. Inject  $\frac{1}{2}$  to 1 cc of the dye solution into the egg.
6. Withdraw the needle, wipe off any leakage which may have come from the egg, and seal the hole with a small amount of paraffin, sealing wax, collodion, or tape.
7. Replace the egg in the incubator. Dye injections can be done at any time between the 12th and 17th day of incubation. Injection can, of course, be done as late as the 17th or 19th day, but greater difficulty of injecting dyes will be encountered.

The injected dye will not affect the growth or development of the embryo. It is not necessary to turn the eggs after 14 days of development.

The chicks will lose this dye color within a few weeks after hatching. All that has been colored is the down and when the normal feathers begin to appear, they will have the normal variety coloring as set by the genetic makeup of the individual.

It may be desirable to brood the chicks for a few weeks where they will not disturb the group, but where observations can be made at regular intervals. It is interesting to note the growth pattern of the feathers on the various sections of the body.

Have members keep a log or journal of the feather development of the baby chicks, noting the day the first feathers appear and the day when all the dyed fluff is gone.

The method described in this lesson is labor intensive and time consuming. Another method of dyeing chicks is to dip them in a warm solution of one part dye and three parts water. Add detergent to the water to improve penetration of the solution. Place the chicks under a source of heat after dipping them in the solution. This method will not hurt the chick or affect its growth or appetite.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Which method of chick dyeing did you choose? Why?
2. What was the most difficult task when coloring chicks or embryos? Why?

#### **Process:**

3. How long do you expect the dye to be noticeable after the chick has hatched? Why? (Discuss feathering sequence.)
4. What was your reaction to temporarily altering the appearance of a chick?

#### **Generalize:**

5. What is your opinion about altering or enhancing your appearance? Makeup? Dyeing your hair? Tattoos? Etc.?
6. How does appearance affect first impressions when meeting someone new?

#### **Apply:**

7. What effect does a first impression have when interviewing for a job?

### **GOING FURTHER:**

- Demonstrate to other groups how to color baby chicks.
- Have a job recruiter talk to your group about the value of first impressions when interviewing for jobs.

### **REFERENCES:**

#### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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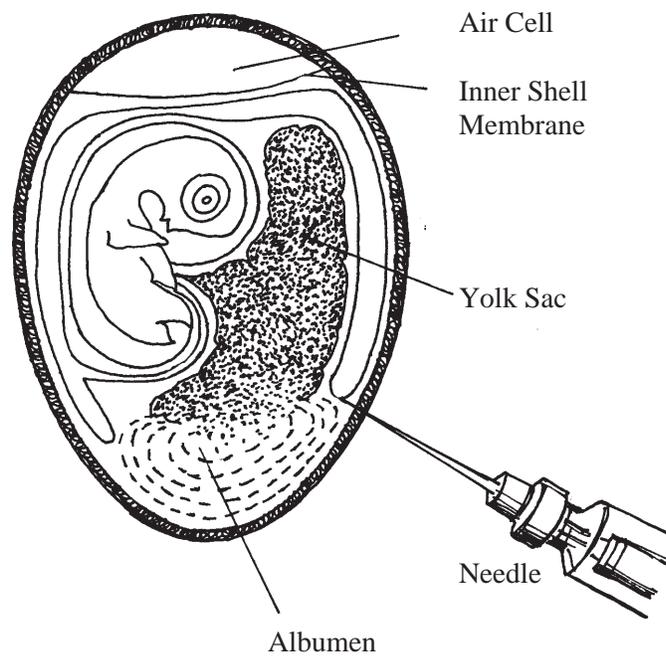
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**CHICK COLORING TO OBSERVE FEATHER GROWTH**  
**POULTRY, LEVEL IV**  
**Member Handout 4, Cross-Section of 11-day-old Embryo Showing**  
**the Site of Dye Injection**





# Chick Coloring to Observe Feather Growth

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- To illustrate plumage development
- To demonstrate the rate of growth of feathers in the chick

#### **ABOUT THEMSELVES:**

- Their feelings about the first impression they make on others
- The value they place on physical appearance

### Materials Needed:

- Fertile chicken eggs—white varieties (White Leghorns, White Plymouth Rocks, White Wyandottes, etc.)
- Incubator
- Egg candler
- Small drill, sharp probe or knife with a good point
- Hypodermic syringe of 1 or 2 cc capacity
- 22-gauge needles, ½-inch long
- Vegetable dyes
- Paraffin, collodion, or cellophane tape
- Tincture of merthiolate or 95 percent alcohol solution
- Member Handout 4, Cross section of 11-day-old Embryo Showing Site of Dye Injection

**ACTIVITY TIME NEEDED:** 45 MINUTES

### ACTIVITY:

### Leader Notes

---

Colored chicks are an excellent attraction in any chick display. There are two ways to color chicks: one is by dipping the chicks in a warm dye solution; and the other is the procedure we will use today by injecting dye into the embryo prior to hatching. Coloring chicks is a method which provides an opportunity for you to study early feather growth. Juvenile plumage will replace the colored down in about two weeks. As this happens, the dyed background amid new growing feathers provides a constantly changing pattern.

#### **Procedure:**

1. The eggs should be incubated for 15 days.
2. The eggs should be candled, although this is not absolutely essential. If the eggs are not candled and all eggs are injected with the dye, some of the eggs may have been infertile or the embryos may have died at an early age and, thus, will not hatch.

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## Leader Notes

---

Break members into groups of two or three. Give each group an egg, syringe, etc., to work on the eggs as you read the instructions.

3. Harmless vegetable dyes, such as food coloring dyes sold in grocery stores, work satisfactorily. Red, green, and blue usually give the cleanest and most distinct results. Coloring by injection of these dyes will not adversely affect the chick in any way.

Sterilize the small end of each egg by wiping it with the merthiolate or alcohol solution. Allow eggs to dry. Place the needle on the hypodermic syringe and draw approximately 1 cc of dye solution into the syringe for each egg to be injected. The amount of liquid is not critical as long as  $\frac{1}{2}$  to 1 cc is used for each egg.

4. Drill a small hole, large enough for the needle on the syringe, in the small or sharper end of the egg shell.
5. Insert the needle into the egg being careful not to stick it into the embryo. Usually  $\frac{1}{4}$  to  $\frac{1}{2}$ -inch penetration into the egg will be sufficient to go into the extra-embryonic membranes. The tissues of the embryo have developed sufficiently that one will be able to "feel" the needle touch the embryo. If this happens, withdraw the needle slightly before injecting the dye. Inject  $\frac{1}{2}$  to 1 cc of the dye solution into the egg.
6. Withdraw the needle, wipe off any leakage which may have come from the egg, and seal the hole with a small amount of paraffin, sealing wax, collodion, or tape.
7. Replace the egg in the incubator. Dye injections can be done at any time between the 12th and 17th day of incubation. Injection can, of course, be done as late as the 17th or 19th day, but greater difficulty of injecting dyes will be encountered.

The injected dye will not affect the growth or development of the embryo. It is not necessary to turn the eggs after 14 days of development.

The chicks will lose this dye color within a few weeks after hatching. All that has been colored is the down and when the normal feathers begin to appear, they will have the normal variety coloring as set by the genetic makeup of the individual.

It may be desirable to brood the chicks for a few weeks where they will not disturb the group, but where observations can be made at regular intervals. It is interesting to note the growth pattern of the feathers on the various sections of the body.

Have members keep a log or journal of the feather development of the baby chicks, noting the day the first feathers appear and the day when all the dyed fluff is gone.

The method described in this lesson is labor intensive and time consuming. Another method of dyeing chicks is to dip them in a warm solution of one part dye and three parts water. Add detergent to the water to improve penetration of the solution. Place the chicks under a source of heat after dipping them in the solution. This method will not hurt the chick or affect its growth or appetite.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. Which method of chick dyeing did you choose? Why?
2. What was the most difficult task when coloring chicks or embryos? Why?

#### **Process:**

3. How long do you expect the dye to be noticeable after the chick has hatched? Why? (Discuss feathering sequence.)
4. What was your reaction to temporarily altering the appearance of a chick?

#### **Generalize:**

5. What is your opinion about altering or enhancing your appearance? Makeup? Dyeing your hair? Tattoos? Etc.?
6. How does appearance affect first impressions when meeting someone new?

#### **Apply:**

7. What effect does a first impression have when interviewing for a job?

### **GOING FURTHER:**

- Demonstrate to other groups how to color baby chicks.
- Have a job recruiter talk to your group about the value of first impressions when interviewing for jobs.

### **REFERENCES:**

#### **Author:**

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### **Reviewed by:**

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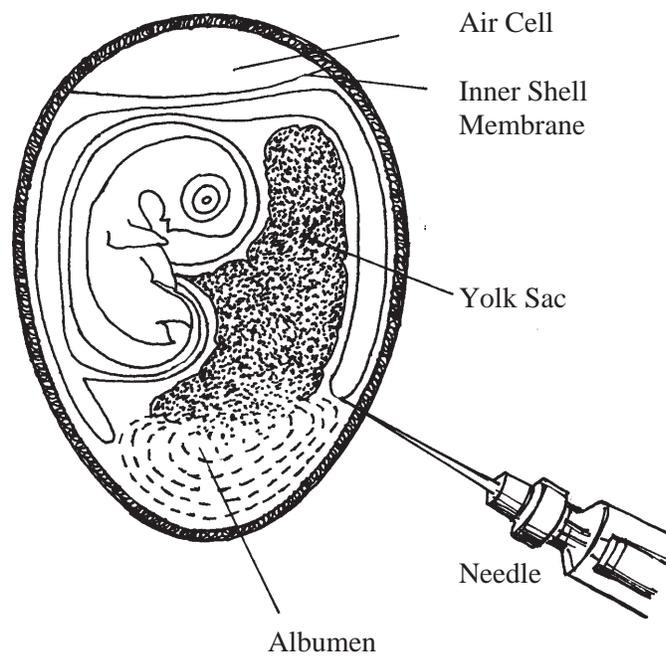
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**CHICK COLORING TO OBSERVE FEATHER GROWTH**  
**POULTRY, LEVEL IV**  
**Member Handout 4, Cross-Section of 11-day-old Embryo Showing**  
**the Site of Dye Injection**





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# Reproductive System of the Hen

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- The main parts and functions of a hen's reproductive tract
- How an egg is formed
- Sections of the reproductive tract in which each part of the egg is formed
- How egg defects occur

#### **ABOUT THEMSELVES:**

- Their feelings about dissecting a hen and locating the actual reproductive tract
- The effects of four basic hormones on embryo development

#### **Materials Needed:**

- Diagram of a hen's reproductive tract (from Reproduction and Fertilization of Poultry, Level III)
- Member Handout 5, Procedure for Dissecting a Hen's Reproductive Tract
- A laying and a nonlaying chicken (at least one hen per four youth)
- Large knife and scissors (for each group)
- Sheet of plastic (for each group)
- Paper towels, sponges, dishpan, etc., for each group of four
- Disposable latex gloves

**ACTIVITY TIME NEEDED:** 60 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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The female chicken has special organs for reproduction. She produces sex cells in the form of **eggs** or **ova**. During a normal reproductive life of 12 to 14 months, a female chicken may lay 250 to 300 eggs that are formed by the **ovary** and its associated **oviduct**. A hen's egg is large because it contains all the food the developing embryo will need during incubation.

#### **Egg Formation**

The hen's reproductive tract is divided into two distinct sections, the **ovary** and **oviduct**. The chicken has two ovaries and oviducts, but only the left ones are functional and produce eggs.

The ovary is a mass of tissue which consists of yolks in varying stages of development. The left ovary is located in the body cavity near the backbone. An ovary contains several thousand yolks that are present at the time the female chick is hatched. When the young female chick (pullet) nears sexual maturity, an increase in secretion of the follicle stimulating

Refer to diagram of ovary and oviduct from Level III lesson, Reproduction and Fertilization of Poultry.

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## Leader Notes

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hormone (FSH) causes immature yolks to start to swell from absorption of yolk material. Each yolk is surrounded by a vascular membrane. A line (**stigma** or **suture**) devoid of blood vessels is evident on the membrane. During release (**ovulation**) of the yolk from the ovary, the sac normally breaks along this line. This prevents bloodspot deposits in the egg. The empty sac is absorbed by the bird's body.

The **oviduct** is the section which completes the formation of the egg. It consists of five sections. The **funnel** or **infundibulum** engulfs the yolk released by the ovary. Fertilization takes place in this section if viable sperm are present. The **magnum** secretes the thick white of the egg, which takes about three hours. Also, the shape of the egg is formed in this section. The next section, the **isthmus**, surrounds the white and yolk with two shell membranes. This process takes about 1¼ hours. Next, the egg moves into the **uterus** where it remains for about 20 hours. Here the thin white and the outer hard shell are added. Since the shell is mostly calcium, the demand for calcium is very high during this time. Shell pigments are also added in the uterus. After the egg is completed, it moves to the **vagina** where it remains until it is laid. It takes from 25 to 27 hours after ovulation to complete formation of an egg. When the egg is laid, it passes into the **cloaca**, which is the common passageway for the reproductive and digestive tracts.

### Hormonal Influence

Various stages in the formation of the egg are under the control of **hormones** that are secreted by the **endocrine glands**. The action of the hormones are very specific. Many of the malfunctions of the reproductive tract that occur in the hen are the results of malfunctions of one or more of the endocrine glands. The major hormones involved in egg formation are:

1. **Follicle Stimulating Hormone (FSH)**. This hormone, which is released by the pituitary gland, is responsible for development of the egg yolks. Secretion of this hormone is under the influence of day length. Increasing day lengths stimulate secretion and decreasing day lengths depress secretion.
2. **Luteinizing Hormone (LH)**. This hormone, which is also secreted by the pituitary gland, causes release or ovulation of the egg yolk from the ovary.
3. **Estrogen**. This hormone, which is secreted by the ovary, stimulates the enlargement of the oviduct and spreading of the pubic bones in preparation for egg production. The ovary also secretes the male sex hormone **testosterone** that causes the pullet's comb and wattles to enlarge and redden.
4. **Oxytocin**. This hormone, which is secreted by the pituitary, stimulates laying of the completed egg.

### Egg Defects

Occasionally, malfunctions occur in the reproductive tract of the hen, resulting in defective eggs. Examples are **double-yolked** eggs, the result of two yolks being ovulated at the same time; **yolkless** eggs, caused by something stimulating the magnum to secrete thick white followed by the addition of the shell; an **egg within an egg**, which we think is caused by a

Now it is time to locate the reproductive parts in an actual mature hen. Prior dissection experience by the leader would help in assisting members to know what to look for and helping them through the process. However, it is important to allow member exploration and provide only minimal assistance to members when they are dissecting and identifying parts.

Pass out Member Handout 5, Procedure for Dissecting a Hen's Reproductive Tract. Depending on number of hens available, let each member dissect a bird. There should be at least one bird for every four members.

Method of termination is recommended by the American Veterinary Medical Association for laboratory procedures.

normal egg traveling back up the oviduct and then being covered with egg white and another shell as it proceeds down the tract a second time; eggs with **odd shapes** or **wrinkled shells**, the result of a malfunction of the uterus from certain diseases; and a **worm** in the egg, which is very rare and occurs when a worm leaves the intestine and gets in the oviduct.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What were the most difficult and the easiest parts of the dissection procedure? Why?
2. What was different about the actual tract as compared to the diagram?

#### **Process:**

3. How long does egg formation take?
4. What hormones affect egg formation and what is the function of each? (Note: List these for further review.)

#### **Generalize:**

5. How does a hen's egg (ova) differ from a mammal's ova?
6. What similarities or differences are there in hormones and their functions in hens as compared to mammals?

#### **Apply:**

6. How will the issues raised by the discussion be useful in the future?

### **GOING FURTHER:**

- Using a hen or diagram, show and explain the different parts of the hen's reproductive tract to your club or class.
- Obtain eggs from as many different species of birds you can and share their differences with your club or class.

### **REFERENCES:**

*Poultry Science*, Ensminger

*Poultry Science Manual*, A.W. Adams, Kansas State University

*Formation of the Egg*, 16mm film, Department of Animal Sciences and Industry, Kansas State University

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## Leader Notes

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**Author:**

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

**Reviewed By:**

R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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## **REPRODUCTIVE SYSTEM OF THE HEN**

### **POULTRY, LEVEL IV**

#### **Member Handout 5, Procedure for Dissecting a Hen's Reproductive Tract**

Note: Members should wear disposable latex gloves when doing this procedure as a disease prevention strategy. A thorough washing of the hands immediately after the procedure is recommended.

1. Obtain from a local poultry producer a hen in active egg production, and, if possible, a hen that is out of production.
2. Humanely terminate the bird(s) by cervical dislocation. This is done by grasping the head in one hand and the legs in the other. Slowly pull on the head until you can feel the vertebra separate.\*
3. After the bird is dead, moisten its feathers in water.
4. Lay the bird on its back on a piece of plastic on a table.
5. Beginning at the vent, make an incision with scissors or knife through the skin running the length of the body over the breast and along the neck to the head region.
6. Make a U-shaped incision through the abdominal wall (ribs).
7. Separate the breast from the carcass at the shoulder joints. The internal organs should now be exposed.
8. Remove the digestive system and heart by severing the digestive system where it enters the body cavity and at the large intestine. Now the ovary and oviduct of the hen should be exposed.
9. Grasp the ovary and cut it away from its attachment to the backbone.
10. Remove the oviduct by severing it where it is attached to the cloaca.
11. Spread the parts on a flat surface.
12. Using a diagram or picture of the hen's reproductive tract, identify and discuss each section. (Refer to Reproduction and Fertilization of Poultry, Level III.)
13. Compare the lengths of the tracts from the laying and nonlaying hens. Why is there such a difference in size?

\* Method of termination is recommended by the American Veterinary Medical Association.





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# Mounting a Chicken Skeleton for Display

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Nomenclature and function of a chicken's bones
- To prepare and mount a chicken skeleton for display

#### **ABOUT THEMSELVES:**

- Nomenclature and functions of some human bones
- Their feelings about following detailed step by step procedures

### Materials Needed:

- A mature chicken (young birds do not have completely calcified bones)
- Sharp knife
- One tube quick-drying cement or glue
- Clear plastic spray
- Small paint brush
- Two feet # 30 aluminum wire
- Three feet #22 wire
- One 16-inch piece of stainless steel wire  $\frac{1}{16}$  inch diameter
- One 21-inch piece of  $\frac{3}{16}$  inch diameter stainless steel rod
- Old toothbrush
- Small bottle of chlorine bleach
- A  $7 \times 12 \times 1$ -inch piece of hardwood for base
- Member Handout 6, The Skeleton of a Fowl
- Small drill

**ACTIVITY TIME NEEDED:** 3 TO 5 DAYS

### ACTIVITY:

Now that you know the major parts of a chicken's skeleton, preparation of a chicken's skeleton for mounting will allow you to visualize how your skeleton is put together, how it functions, and special adaptations of a bird's skeleton for flight.

#### **Procedures for Mounting a Chicken**

1. Obtain a mature bird that is several years old.
2. Terminate the bird by severing its jugular vein at the throat or under proper supervision, use an anesthetic (ether, chloroform, or intravenous urethane at the rate of 2 to 3 grams per kilogram of body weight). Be careful the bones are not broken.
3. After the bird has died, remove the skin with the feathers, all viscera (internal organs), comb and wattles. Cut the meat off the breast, thigh, legs, etc. Do not cut or damage the ribs or other bones. Dispose of all parts except the now relatively cleaned carcass.

### Leader Notes

This activity will need to be divided up into several parts. Each member should have a bird, but some procedures may need to be done in pairs or small groups.

**Caution**—Care should be taken to prevent cutting poorly calcified portions of the skeleton. Special care must be taken when cutting in the regions of the head, face and toes.

4. Remove the scales from the metatarsus (shanks and toes).
5. Remove the internal organs and be careful not to break the pubic bones. It is not essential to remove all soft tissue from the skeleton.
6. Fold the legs, wings and neck along the body and tie with a string to make a small compact mass of intact skeleton.
7. Put the carcass in a container and cover it with water. Boil the water for at least two hours. Reduce the heat and allow the carcass to simmer for another four hours. Using a pressure cooker will shorten cooking time. Cool the cooked carcass and strip off any remaining flesh. Then, scrub the bones clean with a toothbrush. Stringing the bones of the neck and tail with wire will keep them in order to make the assembly job easier.
8. After the skeleton has dried at room temperature or baked at 200°F for an hour, the bones can be bleached by placing them in a solution of 1 cup of chlorine bleach in 4 quarts of water for 24 hours.
9. The piece of hardwood and stiff metal rod will be needed to support the skeleton after drying.
10. Split one end of the rod with a fine tooth metal saw and bend the two resultant prongs into a shape of a U or saddle. Now bend the rod so that the saddle will fit around the thoracic vertebrae between ribs number 2 and 3. Carefully bend the rod (do not bend while it is attached to the skeleton) until it will pass in the mid-sagittal plane (the plane dividing the bird into right and left halves) just below the thoracic vertebrae, diagonally down to the caudal (rear) tip of the metasternum, then continue the rod ventrally at a slope of approximately 135 degrees. The lower end of the rod will eventually be fixed in the center of the wood base. Until this is done, the rod can be held in a vice.
11. Push a piece of heavy wire as far as possible inside the neural canal of the fused vertebrae of the back, then bend it in an S-shape curve to resemble the natural curve of the neck of the bird. Put the first thoracic vertebra in place, and then put the cervical (neck) vertebrae on the wire and push them into their normal positions with the surfaces overlapping. After the cervical vertebrae are in place, cut the wire so that it will extend 1 inch beyond the vertebrae. Bend the end of the wire so that it will support the skull in a natural position. All cervical vertebrae can be glued. Use a quick-drying airplane glue.
12. The femurs of the legs must be inserted into the sockets of the pelvic girdle (ilium-ischium). Hold them in place with a pin of medium-size wire extending from one femur through the socket cavities to the other femur. Make holes for this pin with a small drill.
13. The bones of the legs can be wired together or glued with quick-drying cement. In some cases the bones may be held in a normal position by the ligaments.
14. After attaching the legs to the pelvic girdle as previously described, you can determine the length of the support rod. Cut the rod to the necessary length to support the skeleton in an upright position and anchor it to the base board.

15. The phalanges (wing tips) can now be straightened and put into normal position. Use small drops of quick-drying cement to hold the digits against the wood base. The bones of the wings can be wired or cemented into position. Usually, the humerus and the radius and ulna are parallel to the scapula and metacarpus. The digits extend ventrally at a 90 degree angle from the forearm. For additional support, use a piece of medium-size wire to thread the wing bones and the vertebrae together.
16. The lower mandible (part of beak) can be cemented or wired at the point of contact with the quadrate (skull). The hypoid apparatus (bone which supports the tongue) can be put in place and cemented or supported by a cemented thread. If the strain is not great, the thread works well and is hardly noticeable. The ocular rings may be suspended in two places by cemented thread.
17. When the skeleton is in its final position, you can retouch many joints with quick-drying cement. Then spray it with clear plastic for preservation or brush it with a thin coat of varnish.

**DIALOGUE FOR CRITICAL THINKING:****Share:**

1. As you prepared and assembled the bones, what were some of the surprises you encountered?
2. What were some of the more difficult tasks that you performed? Why?

**Process:**

3. Why is it useful to mount a chicken skeleton?
4. What are some of the unique features of a bird skeleton? Why?

**Generalize:**

5. What other tasks in life require this kind of patience and detail?
6. What are some of the similarities and differences of a chicken's bones and skeletal structure as compared to those of humans?

**Apply:**

7. What other procedures can be compared to this exercise?
8. How can this detailed step-by-step process help you in everyday life?

**GOING FURTHER:**

- Exhibit your completed project at a local or county fair.
- Prepare and present a demonstration or illustrated talk for your next 4-H club meeting.

### REFERENCES:

#### Author:

Adapted from *Science Studies in Poultry Biology*, G. S. Gieger, retired Extension Poultry Specialist, University of Missouri; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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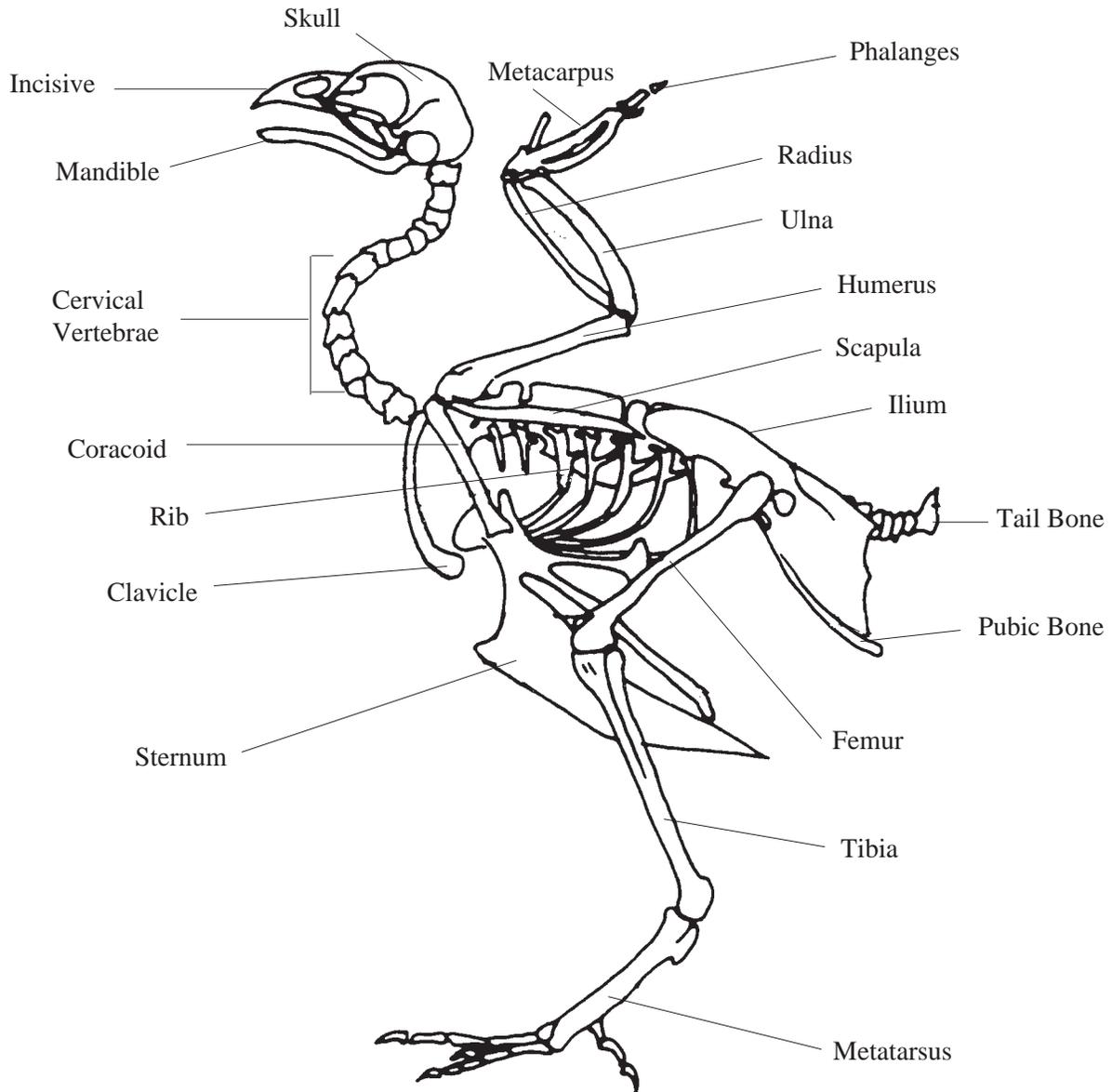
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**MOUNTING A CHICKEN SKELETON FOR DISPLAY**  
**POULTRY, LEVEL IV**  
**Member Handout 6, The Skeleton of a Fowl**



**Think Back:**

What do you remember most after studying a chicken both inside and outside? Why?

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# Promotion and Marketing of Poultry Products

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Promotion and marketing methods
- What poultry products are marketed to consumers
- Who promotes poultry products
- How to develop a commercial for poultry products

#### **ABOUT THEMSELVES:**

- Their ability to be creative and make decisions when promoting themselves for a job
- Their feelings about honesty
- Their interest in promotion and marketing as a career option

### Materials Needed:

- Magazine or newspaper advertisements relating to poultry products
- Large sheet of paper or poster board and marking pens
- Several poultry product packages

### ACTIVITY TIME NEEDED: 60 MINUTES

### ACTIVITY:

What are some reasons why you buy a certain product? How do you learn about new products? What are some products that are advertised to the public? How are products promoted to the public?

#### **Type of Advertising**

Promotion and advertising of products is found all around us in a variety of media. From a simple newspaper advertisement to a major television commercial, advertisements can be seen every second of every day. The promotion of a product may be directed in one or several directions: "It's good for you," "It will make you popular," "It will make you beautiful," "It will save you money," etc.

Some other places that you might find products promoted would be a trade show, store display, and fair exhibit booth, to name a few.

Besides advertisements, products are also promoted through the packaging of the product itself. Products are usually sold or displayed in attractive, eye-catching packaging. What kind of packaging do you find poultry products in? What information would you want to see on the package?

#### **Who Promotes Products?**

A product is not usually marketed by one single person or business. Product advertisement and promotion is handled by a variety of

### Leader Notes

Divide members into groups of two or three. Ask them these questions and write their answers on a large sheet of paper.

Look through magazines and newspapers. Have members share an advertisement with the group and point out the main selling point of that advertisement.

Have members look at packages and list the types of information that is provided.

List sponsors of the various product promotions.

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## Leader Notes

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individuals and organizations. There may be poultry producers, poultry producer organizations, poultry product manufacturers, retail stores, etc. If you look through a magazine or newspaper, identify who is funding the product promotion.

### **Related Activities**

1. Make a poster or scrapbook of poultry advertisements and promotion pieces.
2. Develop a commercial or advertisement for poultry products. Divide your members into groups of two or three. Have each group select a poultry product to advertise. Have members write their own script and present it to the group.
3. Take a tour of a grocery store and look specifically at the merchandising of poultry products. Take note of where the items are located, how they are packaged, what information appears on the label, special promotion displays, etc. Make a list of all poultry products sold.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. What was the main selling point of most poultry product advertising?
2. What do you remember most about the packages of poultry products?

#### **Process:**

3. How do most people learn about new products?
4. How are most products promoted to the public?
5. Who promotes most products? Why?

#### **Generalize:**

6. What did you learn from making your own commercial?
7. What role does honesty have in advertising?

#### **Apply:**

8. How does making a commercial compare with interviewing and applying for a job?
9. What would you do differently if you studied marketing and promotion again? Why?

### GOING FURTHER:

- Contact the Kansas Poultry Association, c/o Dr. Scott Beyer, Extension Specialist, Poultry Sciences, 225 Call Hall, Manhattan, Kansas 66506-0202.
- Visit with an advertising agency to see what guidelines they follow in designing advertisements.
- Develop a promotional exhibit to be displayed with the poultry exhibits at the county fair.

### REFERENCES:

#### Author:

Cynthia R. Siemens, Extension Assistant, Kansas State University; James P. Adams, Extension Specialist, 4-H Youth Programs, Kansas State University

#### Reviewed by:

Albert W. Adams, Professor Emeritus, Poultry Sciences, Kansas State University; R. Scott Beyer, Extension Specialist, Poultry Sciences, Kansas State University

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# Poultry Welfare Issue

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Definitions of five poultry welfare terms
- The advantages and disadvantages of modern poultry production practices
- How to respond to animal activists' inquiries

#### **ABOUT THEMSELVES:**

- Their feelings about their basic human rights
- What forms the basis for their moral position
- The importance of teamwork to solve a problem or develop a program

#### **Materials Needed:**

- Member Handout 7, Animal Relationship Patterns
- Activity Sheet 1, Media Quiz
- Member Handout 8, Egg Producers Husbandry Practices

**ACTIVITY TIME NEEDED:** 45 MINUTES

#### **ACTIVITY:**

#### **Leader Notes**

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The chicken's environment has changed dramatically during this century. Prior to World War II, most farms had a small flock that was kept in a house with roosts, nests, litter to scratch in, and access to outdoor areas in moderate weather. People concerned about the welfare of poultry believe this type of environment is adequate because it is similar to the natural environment of the wild chicken. But the life of a chicken running loose in the wild or outdoor run still faces the dangers of predators, severe weather and disease.

Most recently, the hen's lifestyle and environment have been altered in major ways. Artificial incubation and brooding have replaced the hen, and broody behavior is rarely seen because broody hens don't lay eggs.

Flocks have become fewer but larger in response to increasing housing and equipment costs. This trend has resulted in total confinement, reduced living space per bird, and automatic feeding, watering, egg collection and manure removal. These features have led to the term factory farming or industrialization, which is frequently used as a criticism of modern poultry production practices.

The final step in this trend was the adoption of cages for hens because the number of birds in a house could be increased by stacking rows of cages

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## Leader Notes

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above each other. As the living space per hen was reduced, problems such as **cage fatigue, cannibalism, excessive feather loss, flightiness, and reduced productivity** appeared. To reduce these problems, the poultry industry has adopted such practices as beak trimming, declawing, and low light intensities. These problems and the management practices that have been adopted to reduce them have caused people to raise questions about the welfare of birds kept under these conditions.

What do we mean by **animal welfare**? Generally, it's the treatment we give to, or impose upon the animals we use. A more positive approach is to replace the word welfare with **health and well-being**. Causes of suffering in poultry can be divided into three main forms: **abuse**, which expresses itself as fear, injury, pain and distress; **neglect**, through ignorance or overwork such as malnutrition, disease or distress; and **deprivation**, resulting in changes in normal behavior of the bird.

Who is concerned about animal welfare? Concern about animal welfare is shared by people from diverse backgrounds. Farmers and ranchers consider animal welfare as part of animal husbandry. The provision for basic needs of the animal such as food, water and shelter are considered to enhance the well being of the animal. Most of these basic needs are important to productivity, too. Other persons will add animal needs such as dustbathing that may or may not influence productivity. This expanded vision of animal welfare is currently in debate by scientists, farmers and ranchers, and animal protection advocates.

There are a variety of views of the roles of animals in society and their relationship to humans. Listed below are examples of the different attitudes developed toward animals.

**Animal exploitationists** believe that animals were put on earth for man's use or abuse. They believe the ends justify the means.

**Animal controllists** believe man is here to enforce the laws relative to animal control, such as neutering and humane destruction of surplus animals. It's not their fault people treat animals irresponsibly.

**Animal welfarists** believe that people should treat animals as kindly as possible. Animal welfare advocates want to improve methods of animal husbandry. They also believe in such practices as neutering and humane destruction of surplus animals. There are more conservative expressions of animal welfare in which welfare is considered as meeting basic needs and more radical expressions where needs unrelated to productivity are demanded to be met.

**Animal rightists** believe that animals have rights similar to humans. They typically oppose all use of animals for food, clothing, sport and research. This is a vegetarian ideology, proponents of which want to eliminate livestock production altogether.

**Animal liberationists** believe that animals should not be forced to work or produce in any way for the benefit of man. They believe animals should not be viewed as a resource.

What should be the poultry industry's response to animal activists or to media representatives looking for a story?

**First**, know who the organizations or individuals are and what view they represent.

**Second**, recognize what they are saying. Most likely this will require you to study information about the organization and its human attitudes toward animals.

**Third**, get involved by studying the issues. What are the real issues society is concerned about? Why are they concerned? What laws does your state have that pertain to animal well-being?

**Fourth**, be prepared to respond to these issues in a factual and calm manner. What are the advantages of the modern poultry industry to society? Why is the modern chicken better off than its wild ancestors? How do such husbandry practices as beak trimming improve the welfare of chickens? How can you tell when chickens are receiving proper care?

The modern poultry industry is concerned about the well-being of its birds and have developed husbandry guidelines for the industry such as The United Egg Producers Husbandry Practices for Laying Chickens. The industry knows that good husbandry practices result in good productivity.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How did you feel about discussing the poultry welfare issue?
2. How would you feel if you were asked to represent a view you did not agree with?
3. What specific issue did you discuss most? Why?

#### **Process:**

4. What personal experiences have you had with the animal welfare issue?
5. What position or pattern do you most closely agree with?

#### **Generalize:**

6. What are the public concern issues that have increased the interest in animal welfare? Why has it become an issue?
7. What did you learn about yourself as you discussed the issues in this lesson?

All of the views can be discussed further by using the Member Handout 7, Animal Relationship Patterns. Divide members into diads or triads to discuss the animal relationship patterns.

Give each member Activity Sheet 1, Media Quiz either as a handout and a group discussion or a general group discussion.

Pass out Member Handout 8, Egg Producers Husbandry Practices, to discuss as a group.

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## Leader Notes

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### Apply:

8. What need do you see for this lesson in the future as compared to now and in the past? Why?
  
9. How will you act differently in the future as a result of this lesson?

### GOING FURTHER:

- Make a presentation to your club about one of the major animal rights organizations.
- Make a presentation on husbandry practices used by the poultry industry to improve the well-being of the birds.
- Tour a modern egg production or turkey production facility to view husbandry practices.

### REFERENCES:

Animal Welfare Information Center, National Agricultural Library,  
Beltsville, MD 20705, (301) 344-3704  
Local Farm Bureau

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# POULTRY WELFARE ISSUE

## POULTRY, LEVEL IV

### Member Handout 7, Animal Relationship Patterns

#### An Overview of Animal-Related Organizations, With Some Guidelines for Recognizing Patterns

Animal Exploitation	Animal Use	Animal Control	Animal Welfare	Animal Rights	Animal Liberation
<p>“Animals were put here for our use or abuse. They are our absolute property. They probably don’t perceive pain as we do, and even if they could, it doesn’t matter.”</p>	<p>“Animals are here for our use, but we must be responsible about them (at least until we think our needs are more important). We should attempt to spare them pain and suffering, if possible.”</p>	<p>“We’re here to enforce the laws, ordinances, and regulations agreed to by our lawmakers. No more, no less. It’s not our fault people are irresponsible.”</p>	<p>“People should treat each animal as kindly as possible; they should be required to do so. If they can’t or won’t, we have a duty to look after the suffering or homeless.”</p>	<p>“Animals have intrinsic rights; these should be guaranteed just as ours are. These rights include not being killed, eaten, used for sport or research, or abused in any way.”</p>	<p>“Animals should not be forced to work or produce for our benefit in any way. We should try to eliminate all types of animal use, as well as abuse.”</p>
<p>Groups advocating or conducting activities that are illegal (for the most part) in this country. Most of these were not prohibited in the past and may not now in other countries and cultures. Most involve the pain or death of animals just for the fun of the spectators: bullfighting, dog fighting, cock fighting (legal in some states), live pigeon target shooting, killing or injuring horses, etc, for the movies or TV, “sports” which pit animals of some kind against another kind.</p>	<p>To ensure minimal animal abuse, and to be fair, all groups have rules by which their sports or hobbies are conducted. Some are regulated by law. The trend is for rules to become more stringent and for there to be more censure for those people not abiding by them. <b>The line between abuse and use exists in the mind of the classifier as well as within the legalities and rules of the industry or sport.</b></p>	<p>Municipal and county animal control agencies state and federal wildlife, livestock, disease control, and other regulatory agencies. The USDA (enforcement agent for the federal Animal Welfare Act), state, regional and national animal control organizations and federations. Usually have trouble getting the existing regulations obeyed. In favor of more regulation, if sensible, and funds provided for enforcement. Beset by pro- and anti-regulation individuals and pressure groups.</p>	<p>National groups working for all animals, or specific species or issues. State and regional federations or humane societies. Independent local humane societies, SPCAs, animal welfare leagues, etc, dog breed rescue groups. Those with shelters cannot be too far ahead of local value systems as they are dependent on the public for operating funds. Hunters, rodeo fans and women with fur coats are often valuable supporters of pet animal welfare.</p>	<p>National and local animal rights groups. Anti-vivisection societies. Private, non-profit, non-euthanizing organizations, with or w/out shelters. Home-based “save-a-life” rescue schemes and animal old age homes. Any local or national group devoted to saving something they will not consider killing under any circumstance.</p>	<p>Groups openly calling for animal liberation. These may or may not feel that this can be accomplished only by a complete restructuring of society’s economic base and property rights. Some call themselves activists and may condone or encourage illegal methods, civil disobedience or even violence. Clandestine or underground groups using illegal and sometimes violent activist tactics. In England, where animals of all kinds have been liberated in raids and blood sports activities blocked.</p>
<p>Breed carefully for contests. Eventual suffering of animal unimportant. Breed just to make money.</p>	<p>Groups promote: hunting, trapping, fishing, rodeos, exotic animal keeping, horse and dog sports, various other kinds of animal events, pure breeds of dogs, cats, horses, livestock, etc.</p>	<p>Local animal control agencies may choose to adopt many or all of the principles used by animal welfare shelters and programs.</p>	<p>Local animal welfare agencies may contract governments to conduct animal control programs and/or house impounded animals. Usually have more stringent adoption requirements and may keep animals longer.</p>	<p>Local groups without shelters may espouse the more liberal causes and speak out against rodeos, factory farming, hunting, trapping, use of animals in research, etc.</p>	<p>Divided between regulationists willing to work for the regulation of activities such as rodeo, research, etc, and abolitionists calling for their total ban. May blame or even hate animal control/animal welfare groups for compromising.</p>
<p>Don’t care in what ways, or how traumatic the ways, living creatures are killed.</p>	<p>Associations representing industries such as commercial pet breeders, laboratory animals, livestock producers, game farmers, circuses, zoos, horse and dog racing, etc.</p>	<p>May provide animals for research.</p>	<p>Local animal welfare agencies may contract governments to conduct animal control programs and/or house impounded animals. Usually have more stringent adoption requirements and may keep animals longer.</p>	<p>Wildlife “save-no-matter-what” groups.</p>	<p>Depending on each individual’s sensitivities and priorities, members do not hunt or patronize sports or entertainments involving animals, and are willing to forgo furs, meat, eggs, milk products, leather, the results of medical research or production involving animals, e.g. vaccines, most cosmetics, etc.</p>
<p>Breaking present laws or rules.</p>	<p>Wildlife “conserve-so-can harvest” groups.</p>	<p>More and more advocating or encouraging/requiring spay/neuter.</p>	<p>Will not provide animals for research. Require spay/neuter. Believe that as there are too many pet animals, almost no one should have the right to breed them.</p>		

# POULTRY WELFARE ISSUE

## POULTRY, LEVEL IV

### Member Handout 7, Animal Relationship Patterns, *continued*

#### An Overview of Animal-Related Organizations, With Some Guidelines for Recognizing Patterns

Animal Exploitation	Animal Use	Animal Control	Animal Welfare	Animal Rights	Animal Liberation
<p>“The ends justify the means. We have a right to have fun and do whatever we want with and to animals even if it means breaking the rules or the law.”</p>	<p>The increasingly vocal antidog organizations.</p> <p>At best, hobby and sport breeders breed carefully for best genetic and health potential, cull, socialize, choose responsible owners and will take back offspring if home doesn't work out. At worst, breed just for glory or to support expensive hobby. Advocate the killing or harvesting of animals, birds, fish, etc, for food or other uses. Killing should be as swift and painless as possible. Less likely to want present laws increased or strengthened. May have fought any regulation at all. Insist they can police their own houses.</p> <p>“The ends do not justify the means. The very basis of our system of government is the premise that, no matter what the issue, people can not just take the law into their own hands. There are means available to redress wrongs and to initiate and change rules, regulations and enforcement levels.”</p>	<p><b>Work within the existing laws and systems to accomplish goals. Publicize and document animal abuses and needs to raise public and official consciousness to get changes made.</b></p>	<p>Willing to euthanize surplus pets rather than let them suffer.</p> <p><b>May believe the law is for the other fellow. May include self-styled anti-cruelty investigators and individuals who rescue strays and cruelty cases without benefit of due process.</b></p>	<p>Some would say pet animals have a right to breed. Most would require spay/neuter.</p> <p><b>Unwilling to sanction any taking of life. This may have philosophical and/or empathetic origins.</b></p> <p><b>In order to save the animals involved and to bring their plight to public attention, may advocate civil disobedience, confrontation, harassment, and the illegal removal of experimental pound, or other animals considered to be suffering or likely to be destroyed.</b></p>	<p>Some won't keep pets at all, considering it a form of enslavement.</p> <p>“The ends justify the means. Our cause of ending animal suffering is so just that we have the right to break the law.”</p>

48-Poultry, Level IV

The space allocated to each category does not reflect either the number of organizations of each type or the number of people who would agree with the values described. It is not possible to depict here the graduations of ethical values within organizations any more than it is easy to categorize one's own attitudes toward animals commonly regarded as being vermin, prey, dangerous, endangered, useful, loyal, edible, cute, old, pet, etc, etc.

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## **POULTRY WELFARE ISSUE**

### **POULTRY, LEVEL IV**

#### **Activity Sheet 1, Media Quiz**

1. The media has an important role in developing public policy. \_\_T \_\_F
2. Public understanding of animal welfare is increased through media coverage. \_\_T \_\_F
3. Good media relations can be achieved through consistent contacts with the news media. \_\_T \_\_F
4. It is always best to wait a few minutes before doing an interview with a reporter. \_\_T \_\_F
5. It is always best to let the reporter select the place for the interview. \_\_T \_\_F
6. In order to feel comfortable, ask the reporter for a list of questions in advance. \_\_T \_\_F
7. Questions asked off the record should rarely be used. \_\_T \_\_F
8. Always make sure to find out when the article will run and how long it will be. \_\_T \_\_F
9. Radio interviews should not be conducted over the telephone. \_\_T \_\_F
10. Always call and make an appointment before dropping by to see the editor. \_\_T \_\_F
11. In order to communicate effectively with a television audience, the person being interviewed should look at the camera. \_\_T \_\_F
12. A good public speaking voice is necessary for a broadcast interview. \_\_T \_\_F
13. It is always good to prepare a short standard message for broadcast interviews. \_\_T \_\_F
14. Being armed with plenty of facts is important in the preparation for an interview. \_\_T \_\_F
15. Hypothetical questions should be avoided. \_\_T \_\_F

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## POULTRY WELFARE ISSUE

### POULTRY, LEVEL IV

#### Member Handout 8, Egg Producers Husbandry Practices

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(firm name)

Herein subscribes to the following practices outlined in the United Egg Producers Recommended Guidelines of Husbandry Practices for Laying Chickens.

- **To provide** the housing and equipment necessary to protect the health and welfare of my flocks.
- **To provide** the necessary sanitation, vaccination, and medication programs to protect the health of my flock from disease, infection and poultry illness. No drugs are used to stimulate growth.
- **To maintain** all feed, water, light, ventilation and standby equipment in good operational condition.
- **To provide** cages that have adequate space and take into consideration the welfare of my flock.
- **To give** due consideration to the welfare of the flock when making husbandry decisions.
- **To use** humane methods when it becomes necessary to dispose of any bird.
- **To schedule** a daily inspection of all birds on my farm.
- **To make** all personnel knowledgeable of those factors that can cause discomfort to pullets and hens.
- **To follow**, to the best of my ability, the recommendations set forth in the Guidelines of Husbandry Practices for Laying Chickens.

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(authorized firm signature)



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# Careers in the Poultry Industry

## *Poultry, Level IV*

### What Members Will Learn . . .

#### **ABOUT THE PROJECT:**

- Ten possible poultry careers
- Salary ranges for poultry careers
- Educational requirements for poultry careers

#### **ABOUT THEMSELVES:**

- Their likes and dislikes about the poultry industry
- Their ability to discuss major factors in making career choices
- Their feelings and interest in education as it reflects on career choices

#### **Materials Needed:**

- Notebook and pencil
- First page of Member Guide and Annual Report (at the end of the Introduction)

#### **ACTIVITY TIME NEEDED:** DEPENDS ON INTEREST

#### **ACTIVITY:**

A few years ago, the poultry business was considered a weak moneymaking enterprise. However, since the increase in demand for poultry meat, the poultry industry has become a very successful enterprise.

The following aspects of the poultry industry should be considered before studying specific careers:

1. The scope of the industry in your area and state
2. The importance of poultry in the United States as opposed to other countries
3. The production phases or segments of the industry:
  - a) Hatcheries
  - b) Fryers
  - c) Broilers
  - d) Pullet growing
  - e) Layer operations
  - f) Egg industry
  - g) Roasters
  - h) Turkeys
  - i) Ducks and geese

Consider some of the following methods to help you analyze possible poultry careers:

1. Invite a poultry specialist, career counselor or other resource person to visit your group.

#### **Leader Notes**

Learning about careers in the poultry industry could be a single visit or a whole series of activities depending on your members' interest.

Refer to front page of the Member Guide and Annual Report for additional careers.

Remind members to complete step 8 in their Member Guide after this lesson. Reflect and record some of the highlights of all the years in the poultry project.

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## Leader Notes

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Each of these ideas could be an entire meeting, or small groups of members could visit industry locations or interview people in a career and report back to the group. Have each member keep a log or diary of each career studied.

2. View movies, slide sets or videos on poultry careers.
3. Visit segments of the industry in your area.
4. Invite poultry company representatives to your meetings.
5. Invite a poultry feed company or pharmaceutical company representative to your meeting.
6. Do a computer job or career search in your local library.
7. Study consumer and food safety related jobs.
8. Ask someone from a government agency to discuss state, national and international opportunities.
9. Study opportunities for research and teaching.
10. Have a discussion with other members about their career plans and what their goals are for the next 5 to 10 years.

### **DIALOGUE FOR CRITICAL THINKING:**

#### **Share:**

1. How many poultry careers do you know about? (List and discuss.)
2. What was the most interesting aspect of all the poultry careers you studied? Why?

#### **Process:**

3. What were some of the pros and cons of various poultry careers?
4. What decisions must you make to prepare for most poultry careers?

#### **Generalize:**

5. What did you learn about yourself through this activity?
6. How could this career study process help you in related fields or other career options?

#### **Apply:**

7. What educational requirements are needed for most careers? Why?
8. If you were to study other career possibilities, what would you do differently? Why?

### **GOING FURTHER:**

- Write to the USDA and other poultry agencies, such as the Poultry Science Association, for more information.
- Give presentations to other groups about the opportunities in the poultry industry.

### REFERENCES:

#### Videos:

*Consider a Career in Poultry Science, (Youth)* and *Poultry Science: A Dynamic Career Choice, (Leaders)*; Kansas Poultry Association, 130 Call Hall, Manhattan, Kansas, 66506-1600

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