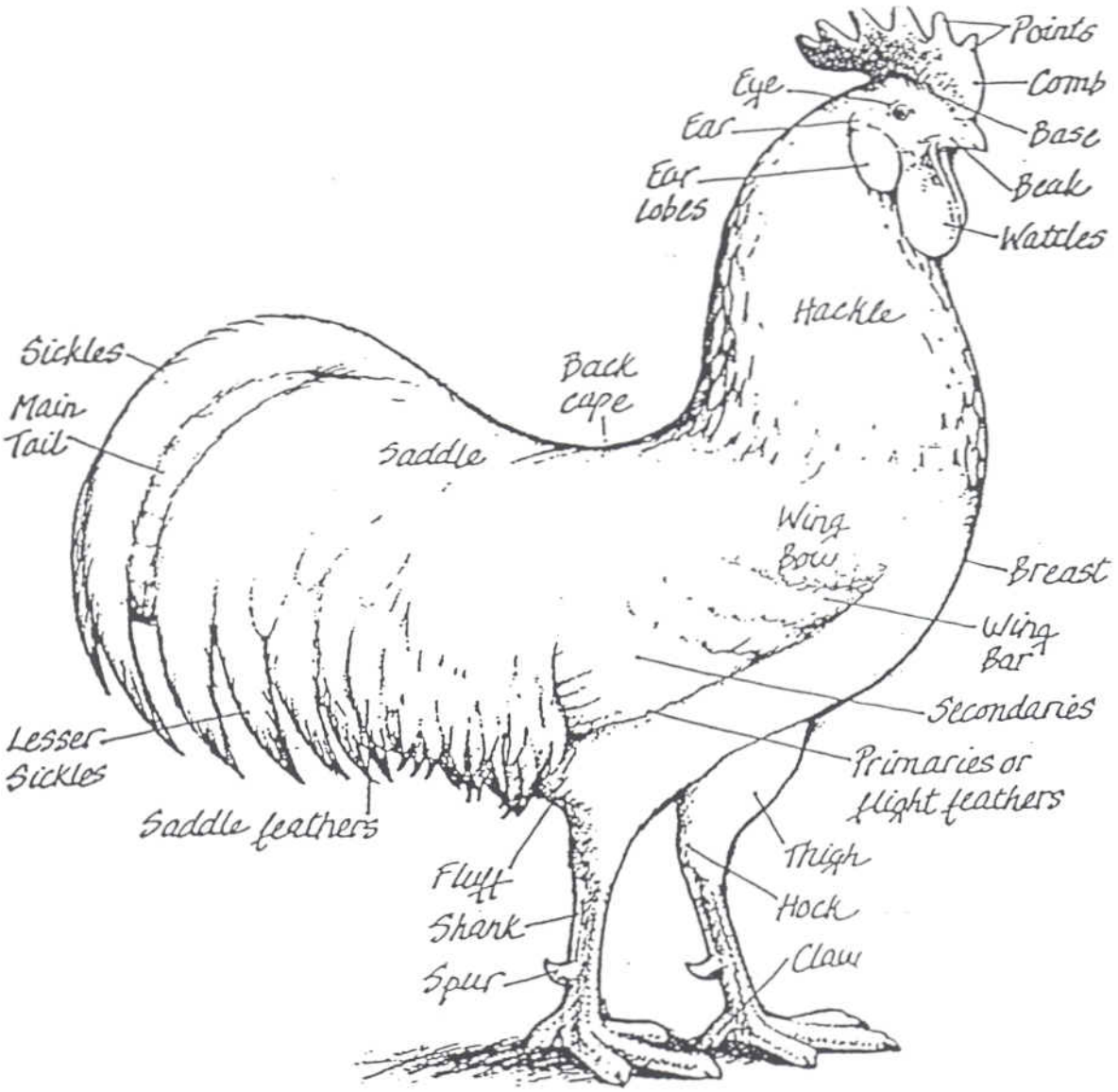
SMALL ANIMAL EXPO - Madera County

POULTRY STUDY GUIDE (Level III and IV)

Parts of the Male Chicken



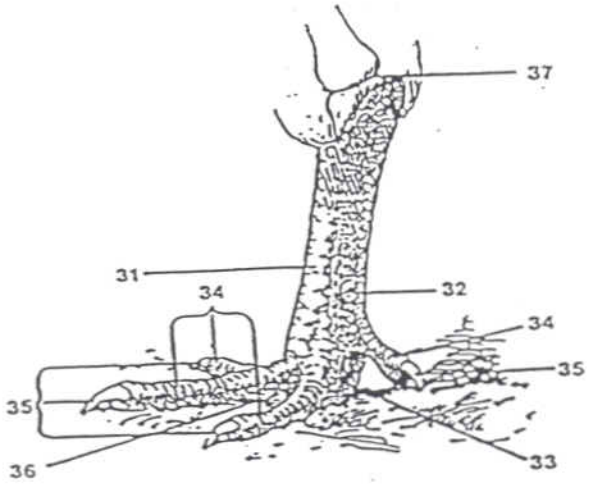


Figure 6
FEMALE

31. Shank
32. Spur
33. Foot
34-34. Toes
35-35. Toe-Nails
36. Web
37. Middle of Hock Joint

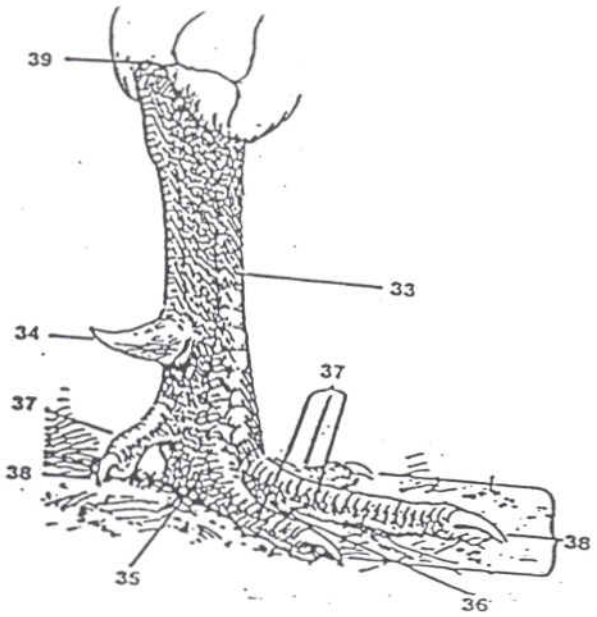


Figure 5
MALE

33. Shank
34. Spur
35. Foot
36. Web
37-37. Toes
38-38. Toe-Nails
39. Middle of Hock Joint

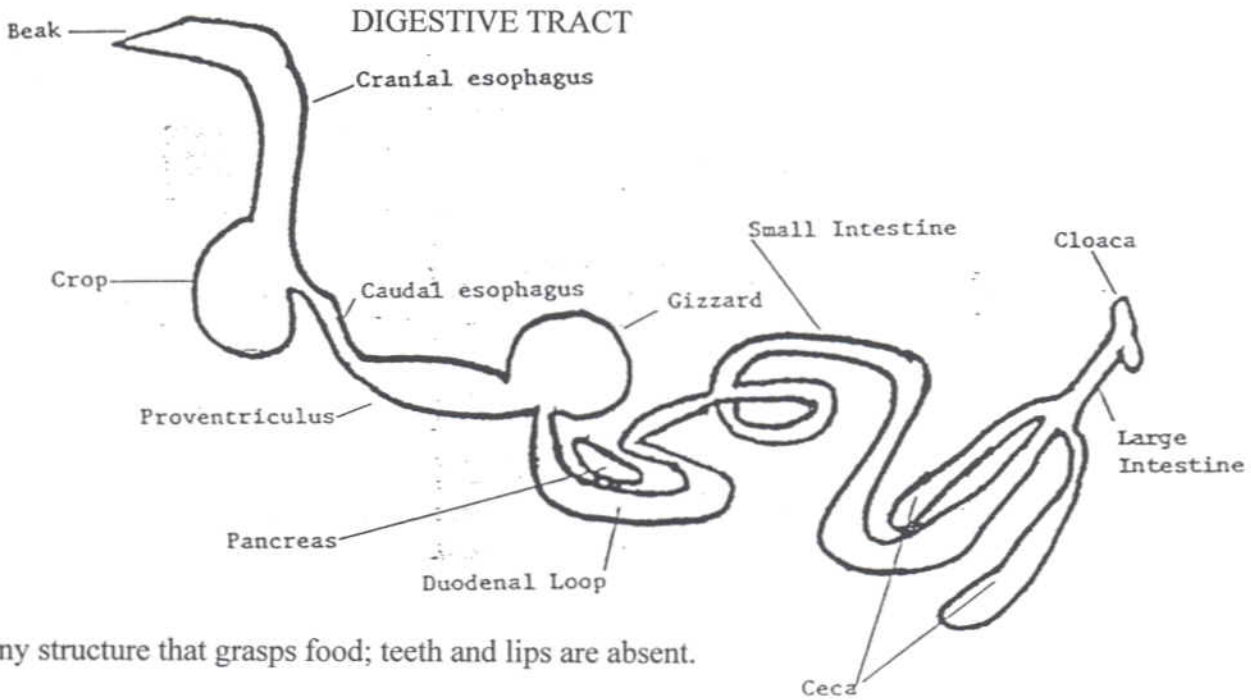
Figure 37
Parts of Wing

1. Front 2. Bow 3. Bar
4. Secondary 5. Primaries
6. Primary Coverts
7. Wing Shoulder

TABLE I - POULTRY DISEASES

DISEASE	SPECIES AFFECTED	SYMPTOMS	PREVENTION AND TREATMENT*
Coccidiosis	Chickens, pheasants, other game birds and turkeys	Droopy birds, blood droppings, emaciation, high mortality, drop in food consumption, drop in egg production, inflamed and bloody intestine and caeca.	Prevent by continuous use of anticoccidal drug in feed. In an outbreak use anticoccidial drugs such as amprolium at .012% or .024 % for 5-7 days. Sulfaquinoxaline can be used where no hemorrhage exists. In the presence of hemorrhage use Amprolium. Do not use Sulfanilamides in birds producing eggs for human consumption. Follow label directions.
Blue Comb (infectious enteritis)	Chickens and turkeys	Starvation, depression, sour crop, dehydration, depressed production, broken yolk and cyanosis (darkening of skin.)	Highly responsive to antibiotic treatment of Aureomycin, terramycin or penicillin in water.
Fowl Cholera	Turkey, chicken and game birds	Lesion of septicemic disease; liver congested, darkened and enlarged. Sudden deaths in range turkeys. Necrotic liver (yellow spots.) Depression and diarrhea.	Treatment with sulfa drugs and antibiotics.
Black Head	Turkeys, chickens and game birds	Droopiness, weakness, loss of appetite, watery, sulfur-colored droppings especially in turkeys.	Prevent by feeding antihistomidal drugs such as Emtrymix or Histostat. Treat an outbreak with Emtrymix.
Infectious Synovitis	Chickens and turkeys	Depression, loss of appetite, loss of weight; lameness by inflamed swollen joints; breast blisters; sudden death; decreased egg production.	Broad - spectrum antibiotic in feed or water.
New Castle	Chickens, turkeys, pheasants, pigeons, etc.	Gasping, coughing, rattling, occasional paralysis, egg production drops to zero, soft-shelled or poor quality eggs.	No drug effective. Prevent by vaccination
CRD (Chronic Respiratory Disease - air sac)	Chickens and turkeys	Sniffing, rattling, sneezing, depressed appetite, reduced egg production, diarrhea.	This is a stress disease - eliminate stress. Treat with 500 grams of Aureomycin per ton of feed Streptomycin or lylosin in water.
Fowl Pox	Chickens, turkeys and pheasants	Loss of appetite, dullness, wet pox, discharge from eyes and nostrils; dry pox on unfeathered portions of skin.	Use fowl or pigeon pox vaccine in areas where disease is prevalent.
Mareks	Domesticated and wild fowl	Paralysis of various parts of body and birds slowly waste away from lack of water and feed. Infected from day-old to 4 weeks of age. Tumors.	Vaccinate with Turkey Herpes virus when day-old at the hatchery.

*Any disease demands accurate diagnosis which is available at state, state university and hatchery laboratories. Follow your veterinarian's recommendations.



Beak - horny structure that grasps food; teeth and lips are absent.

Cranial esophagus - tube located between the oropharynx (mouth) and the crop.

Crop - an outpocketing of the esophagus. Food is stored here and during storage the food is softened. NO digestion takes place in the crop.

Caudal esophagus - tube located between the crop and the proventriculus.

Proventriculus- the glandular stomach. Produces both hydrochloric acid and pepsin.

Gizzard - also known as the ventricular or muscular stomach. The walls of the ventriculus are made up of 4 muscle masses. Ventriculus is lined with a hardened membrane. Small stones or grit, ingested by the bird, are kept in the ventriculus and aid in the bread down of food. Although hydrochloric acid and pepsin are produced in the proventriculus, most digestion takes place in the ventriculus.

Duodenum - the first loop of the small intestine.

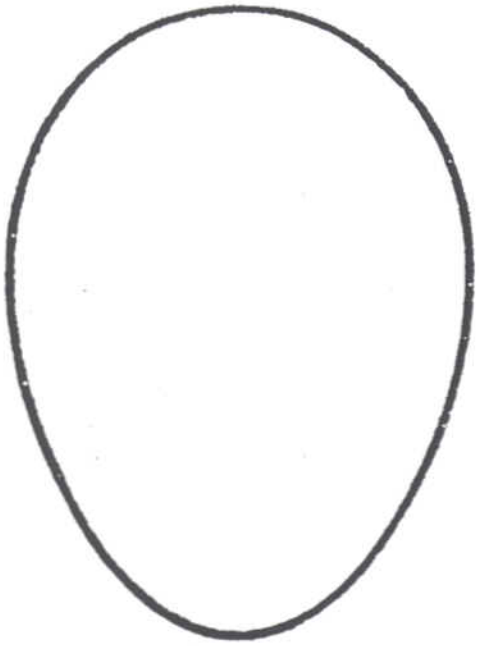
Pancreas - this gland lies in the duodenal loop.

Small intestine - in addition to the duodenal loop, the remainder of the long small intestine are arranged in narrow loops. Small intestine is important for chemical digestion and absorption of food.

Ceca - two blind ended pouches found at the junction of the small and large intestines. Each pouch is called a cecum; together they are called the ceca.

Large intestine - may be important for water absorption.

Cloaca - the digestive, urinary, and reproductive tracts all terminate here.



Introduction to the Avian Egg

The avian (bird) egg is a wonder of nature. A complex reproductive cell, it is a small center of life, a world of its own.

As we know it, the egg is the single most complete food known to humans. The egg can be used in many different ways and is a very good food. It is used every day in preparing the most common or the fanciest of meals.

Scientifically, an egg (ovum) is the reproductive cell produced by the female. It remains a single cell when fertilized by the single cell (nucleus) of the male sperm, but then it has a full set of chromosomes and genes (which control inheritance.)

The completed single cell (zygote) then rapidly divides into two cells, four, eight, 16, 32, 64, and so on. The faint outline of a developing embryo and a network of blood vessels soon can be seen surrounding the yolk and other nutrients.

What is normally called "an egg" (the chicken egg, for example, is a complex structure that feeds and protects the embryo growing from the zygote. A healthy chick can be hatched from each fertile egg. The egg needs only a warm, humid environment while the embryo is maturing.

Human nutrient needs are not the same as those of the chick. However, they are alike in so many ways that the egg has become an important source of many of the essential proteins, minerals, and vitamins needed for our good health.

What Is An Egg?

Looking at the egg from the outside, we see the shell, which is a hard, protective covering composed mostly of calcium carbonate (Figure 1). The shell is porous and the pores at the larger end are larger and more numerous than those at the small end. About 7,000 pores are in the shell of a chicken egg. Carbon dioxide and moisture are given off through the pores and are replaced by atmospheric gases, including oxygen.

Right under the shell are two membranes, the outer and inner shell membranes. These membranes protect the contents of the egg from bacterial invasion and prevent liquid from evaporating too rapidly from the egg.

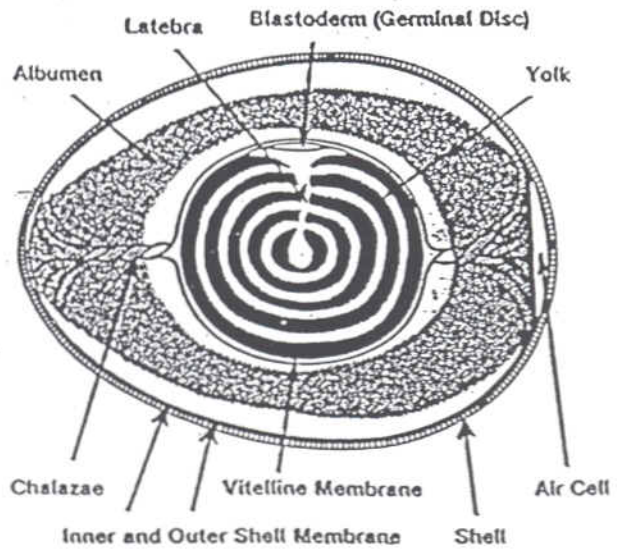


Figure 1. Parts of an egg.

Because the body temperature of a hen is about 107°F, eggs are the same temperature at the time they are laid. The temperature of the atmosphere normally is much lower than 107°F, and the egg cools to the temperature of its surroundings. As cooling takes place, the contents of the egg contract (become smaller) more than the shell. This creates a vacuum, and air is drawn through the larger more porous end of the shell. The air cell serves as a tiny shock absorber during early development of the embryo. At the 20th day of incubation (development of the chick inside the egg) the chick pokes its beak into the air cell. By this time the cell has become larger, and the chick draws its first breaths of air from this space.

The shell membranes surround and contain the white or albumen of the egg. The albumen is mainly water that provides the liquid medium in which the embryo develops, but it also contains large amounts of protein necessary for proper growth of the embryo.

In a fresh egg you can see two white cords attached to the yolk and to the inner shell membrane at the ends of the egg. These two cords, called chalazae, are made up of twisted strands of fibers that are a special form of protein. The chalazae hold the yolk in the center of the egg.

The yolk contains large amounts of fat as well as vitamins and minerals needed for normal growth. The fat in the yolk combines with oxygen that is taken in through the pores of the shell, and together they provide large amounts of energy. Once the energy is used, water, which replaces the water lost by evaporation, and carbon dioxide remain. The carbon dioxide combines with water to make a weak acid that dissolves the shell. The calcium part of the dissolved shell passes through the shell membranes and is used by the embryo to make its skeleton. Removing the calcium to make the skeleton weakens the shell. This helps the chick embryo make its exit from the shell during hatching.

The blastoderm is really the "true egg." From the blastoderm the embryo is formed. The remaining parts of the egg are to feed, care for, and protect the developing chick embryo.

The egg is truly a world of its own - a wonderful, versatile, nutritious food for humans and a miraculous means of reproduction for the chicken.

Learning Activities

1. Break an egg into a dish. Referring to the drawing of the egg, identify the following parts: inner and outer shell membrane (found inside the shell), chalazae cords, albumen or white of the egg, yolk, germinal disc (blastoderm).
2. See if you can identify other animals that come from eggs. How are seeds and eggs similar? _____

_____

_____

_____

3. Take an egg and squeeze it as hard as you can, applying equal pressure on all sides. It is suggested that you do this at arm's length over a bowl. If you apply equal pressure and the egg is not cracked, you can feel the egg flex in you hand; but it will not break.
4. With the help of your teacher or leader, examine an egg that is 3 weeks old, one that is 1 ½ weeks old, and one that is as fresh as possible. Hold them point down and shine a bright light through them. Notice the difference in the size of air cells at the round end of the eggs.

A really fresh egg has an air cell slightly larger than a dime. As the liquid in the egg evaporates, the air cell becomes larger.

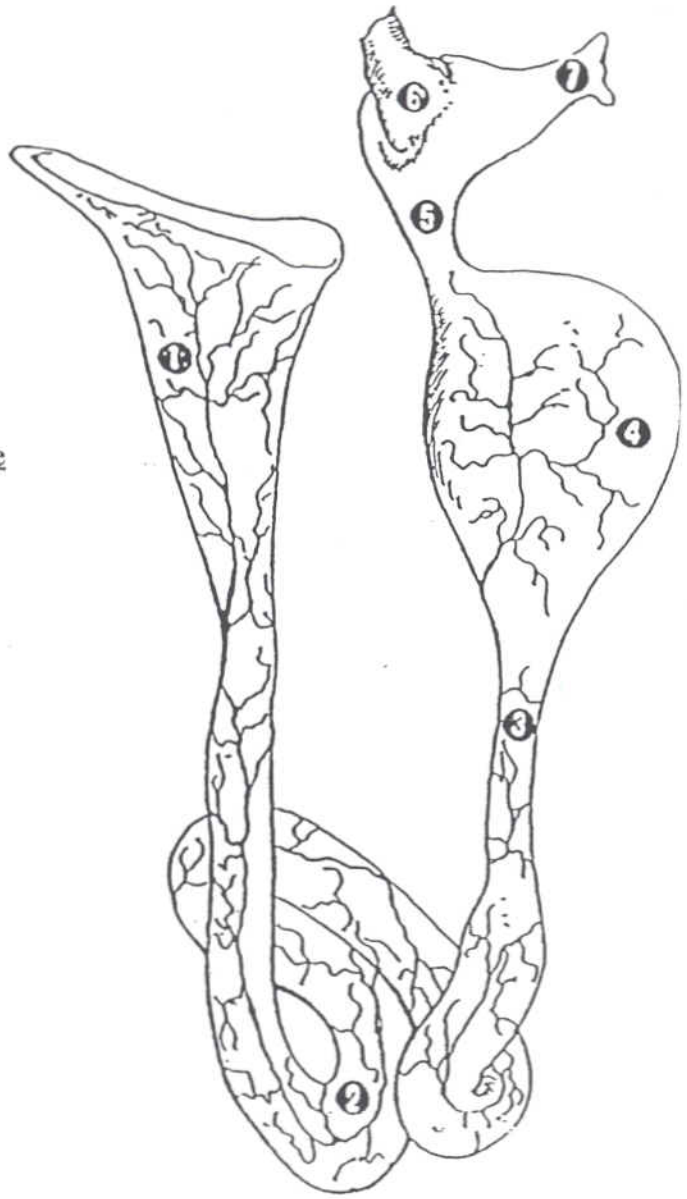
Break the eggs into three separate dishes and observe the differences in them. As the egg ages, the egg white spreads out and the egg yolk becomes flatter.

Upon release from the follicle, the yolk drops into the body cavity. There the infundibulum or funnel engulfs the yolk and initiates the journey down the oviduct. The oviduct is more than two feet long and is lined with glands which secrete the materials for the albumen, shell membranes and shell. These structures are progressively added to the yolk as it traverses the oviduct. Twenty-four hours or more are required from the time the yolk is released until the completed egg is laid. The process of laying is called oviposition.

The whole sequence of egg formation is regulated by a series of bloodborne chemical messengers called hormones. Most of these regulatory hormones are produced by the pituitary gland; a tiny mass of secretory tissue located near the base of the brain. Light falling on the eye excites nerves that transmit messages to the base of the brain. These nerve impulses control the release of specific chemicals into the blood supply of the pituitary. These chemical substances, in turn, control the secretion of pituitary hormones. Thus, light stimulates egg production through the chain of eye, brain, pituitary, ovary and oviduct.

OVARY
1 Mature Yolk within Yolk Sac or Follicle
2 Immature Yolk
3 Empty Follicle
4 Stigma or Suturel

FIGURE 1. Enlarged drawings of ovary, oviduct.



Structure	Function	Time Egg Spends There
- Infundibulum	Grasps ovulated ovum	15 min
- Magnum	Deposits albumen	3 hr
- Isthmus	Deposits the 2 Shell membranes	1 ½ hr
- Shell Gland	Add water, forms shell, & adds pigment if the shell is colored.	20+ hr
- Vagina - Cloaca - Vent	Egg is expelled through these areas	seconds

TABLE 1. Important Events in Development of the Chick Embryo

Before egg-laying	Fertilization
	Division and growth of living cells
	Separation 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 likeness to a chick embryo
18 hours	Appearance of alimentary tract
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 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	Formation of reproductive organs and sex determination
Sixth day	Beginning of formation of beak and egg-tooth
Eight day	Beginning of formation of feathers
Tenth day	Beginning of hardening of beak
Thirteenth day	Appearance of scales and claws
Fourteenth day	Embryo turns its head toward the blunt end of egg
Sixteenth day	Scales, claws, and beak becoming firm and horny
Seventeenth day	Beak turns toward air cell
Nineteenth day	Yolk sac begins to enter body cavity
Twentieth day	Yolk sac completely drawn into body cavity
	Embryo occupies practically all the space within the egg except the air cell
Twenty-first day	Hatching of chick

Physiological Processes Within the Egg. - Many physiological activities or processes (activities of life) take place in the course of the egg changing into the chick. These processes are: the use of highly nutritious food materials from the egg; the respiration of gases or taking in of oxygen and the removal of carbon dioxide; and the building up of living energy within the chick with the elimination of heat (Figure 2).

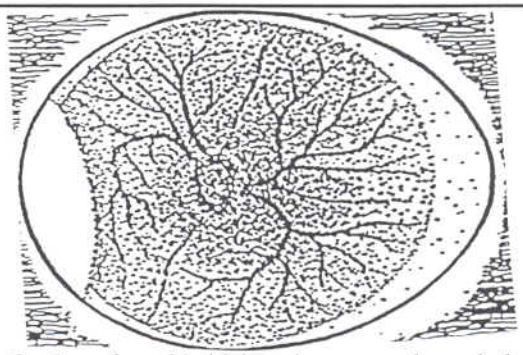


Figure 2. Four-day-old chick embryo seen through the shell.

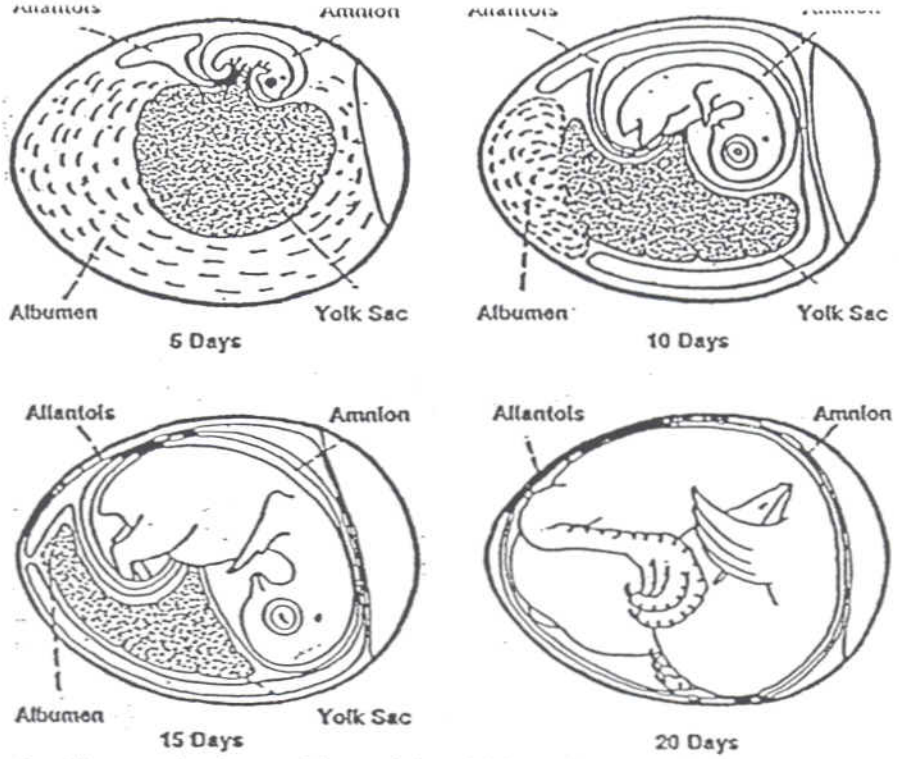


Figure 3. Changes in the position of the chick embryo and its membranes.

Function of Embryo Membranes. - Special temporary organs or membranes are formed within the egg, both to protect the embryo and to provide for its nutrition (feeding), respiration (breathing), and excretion (waste removal). These organs include the yolk sac, amnion, and allantois (Figure 3). The yolk sac supplies food material to the embryo. The amnion, by enclosing the embryo, provides for its protection. The allantois serves as a respiratory organ and as a storage area for waste matter. These organs function within the egg only until the time of hatching and from no part of the fully developed chick.

Function of Blood Vessels During Incubation. - While the chick is growing in the egg, there are two sets of blood vessels. One set, the vitelline vessels, carries the yolk materials to the growing embryo. The other set, the allantoic vessels, deals with respiration and with carrying waste products to the allantois (Figure 4). When the chick is hatched, these blood vessels stop functioning.

Note daily development of embryo during incubation in Figure 5.

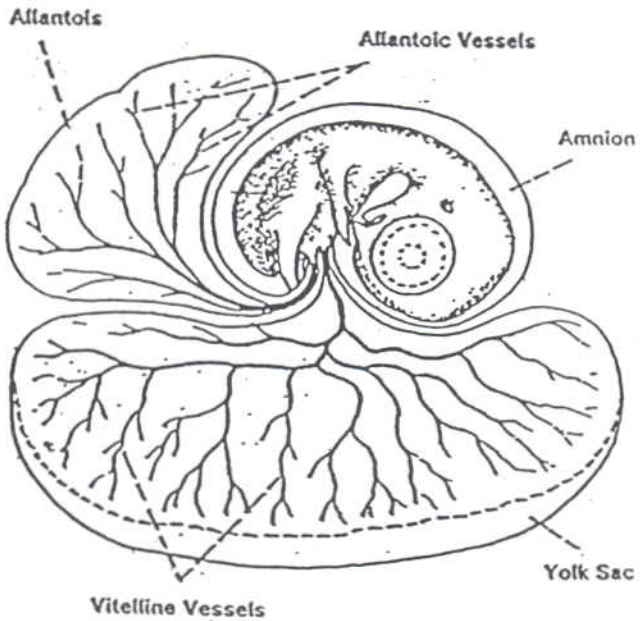


Figure 4. Seven-day-old embryo with its membranes and blood vessels.

Application of Standards

Use the specifications given in Table 1 to determine the grade of an egg by candling. Consider air cell depth, yolk outline, and albumen quality.

Table 1. Summary of Standards for Interior Quality of Eggs by Candling for 4-H Poultry Judging

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" in diameter	Blood or meat spots aggregating more than 1/8" in diameter

Table 2. Summary of Standards for Exterior Quality of Eggs

Factor	Grade		
Stain	**AA or A**	**B**	**Dirty**
	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.	

Understanding the Food Poisoners

What is Food Poisoning? Food poisoning, caused by harmful bacteria, normally produces intestinal flu-like symptoms lasting a few hours to several days. But in cases of botulism, or when food poisoning strikes infants, the ill or the elderly, the situation can be serious.

Where do these bacteria come from and how can they be stopped? Food poisoning bacteria, microscopic in size, surround us - in the air, soil, water, in our own digestive tracts and in those of many animals. The only way they can effectively be stopped is by careful attention to food handling rules like those outlined in this leaflet.

Bacteria	How it Attacks	Symptoms	Prevention
Staphylococcus aureus (Staph)	Staph spreads from someone handling food. It is found on the skin and in boils, pimples and throat infections. At warm temperatures, staph produces a poison.	2-8 hours after eating, you could have vomiting and diarrhea lasting a day or two.	Cooking won't destroy the staph poison, so: - Wash hands, utensils before preparing food. - Don't leave food out over 2 hours. - Susceptible foods are meat, poultry, meat and poultry salads, cheese, egg products, starchy salads (potato, macaroni, pasta and tuna), custards, cream- filled desserts.
Salmonella	You can get salmonella when infected food - meat, poultry, eggs, fish - is eaten raw or undercooked. Other cases? When cooked food comes in contact with infected raw food, or when an infected person contaminates food.	In 12-36 hours you could have diarrhea, fever and vomiting lasting 2-7 days.	Keep raw food away from cooked food, and, - Thoroughly cook meat, poultry, fish. - Be especially careful with poultry, pork, roast beef, hamburger. - Don't drink unpasteurized milk.
Clostridium perfringens	This "buffet germ" grows rapidly in large portions of food that are cooling slowly. It can also grow in chafing dishes which may not keep food sufficiently hot, and even in the refrigerator if food is stored in large portions which do not cool quickly.	In 8-24 hours you could have diarrhea and gas pains, ending usually in less than a day. But older people and ulcer patients can be badly affected.	Keep food hot (over 140°F) or cold (under 40°F) and, - Divide bulk cooked foods into smaller portions for serving and cooling. - Be careful with poultry, gravy, stews, casseroles.
Campylobacter jejuni	You drink untreated water on an outing. Your pet becomes infected and spreads it to the whole family, or you eat raw or undercooked meat, poultry or shellfish.	In 2-5 days you could have severe (possibly bloody) diarrhea, cramping, fever and headache lasting 2-7 days.	Don't drink untreated water or unpasteurized milk, and: - Thoroughly clean hands, utensils and surfaces that touch raw meats. - Thoroughly clean hands, utensils and surfaces that touch raw meats. - Thoroughly cook meat, poultry and fish.
Clostridium botulinum	Often occurs in home-canned or any canned goods showing warning signs- clear liquids turned milky, cracked jars, loose lids, swollen or dented cans or lids. Beware of any jar or can that spurts liquid or has an off-odor when opened.	In 12-48 hours your nervous system could be affected. Symptoms? Double vision, droopy eyelids, trouble speaking, and swallowing, difficult breathing. Untreated, botulism can be fatal.	Carefully examine home canned goods before use, and: - Don't use any canned goods showing danger signs. - If you or a family member has botulism symptoms, get medical help immediately. Then call health authorities.

Note: While the chart highlights the preventive measures most important in avoiding each type of bacteria, you should understand that all the rules of prevention should be followed with all food.

Adapted from Food News for Consumers, Summer 1988, FSIS, USDA

BREEDS TO LEARN

Breed	Class	Comb	Variety
Araucana	All Other Standard Breeds	Pea	Silver Duckwing
Australorp	English	Single	
Brahma	Asiatic	Pea	Buff
Call Duck	Bantam Duck		Grey
Cochin	Asiatic	Single	Black
Cornish	English	Pea	White
Dominique	American	Rose	
Faverolle	Continental	Single	Salmon
Japanese	Single Comb Clean Legged	Single	Black Tailed White
Leghorn	Mediterranean	Single	Light Brown
Modern Game	Game	Single (dubbed)	Birchen
Necked Neck	All Other Standard Breeds	Single	Buff
Old English	Game	Single (dubbed)	Columbian
Pekin	Heavy Weight Duck		White
Phoenix	All Other Standard Breeds	Single	Silver
Plymouth Rock	American	Single	Barred
Polish	Continental	V shape	White Crested Black
Sebastopol	Goose		White
Sebright	Rosecomb clean Legged	Rose Comb	Silver
Shamo	All Other Standard Breeds	Pea	Black Breasted Red
Silkie	Feather legged Bantam	Walnut	Non-Bearded White
Sumatra	All Other Standard Breeds	Pea	Black
Turkey-Royal Palm	Turkey		
Wyandotte	American	Roseridge	Partridge