

Unit A: Introduction to Poultry Science

Lesson 2: External Anatomy of Chickens

Terms

- **Back**
- **Beak**
- **Body**
- **Breast**
- **Cape**
- **Comb**
- **Ear**
- **Ear Lobe**
- **Eye**
- **Face**
- **Fluff**
- **Nostril**
- **Hackles**
- **Head**
- **Hock**
- **Shoulder**
- **Sickle feathers**
- **Thigh**
- **Saddle**
- **Shank**
- **Spur**
- **Tail Coverts**
- **Tail Feathers**
- **Toe**
- **Wattles**
- **Wing Coverts**
- **Wing Secondaries**
- **Wing Primaries**

I. A chicken is a bird.

A. One of the features that differentiate it from most other birds is that it has a comb and two wattles.

1. The comb is the red appendage on the top of the head, and the wattles are the two appendages under the chin.

2. These are secondary sexual characteristics and are more prominent in the male.

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3. The comb and wattles have a purpose. They serve as a cooling system.
 - a. Chickens do not sweat to provide cooling.
 - b. Instead, birds are cooled by blood that flows through the comb and wattles.
 - c. Warmer blood from the body flows into the comb and then returns to the interior parts of the body as it cools.



B. Chicken feathers provide insulation that helps to keep birds warm and protects the bird's skin from getting wet.

1. When chicks hatch, they are covered with down.

- a. Feathers begin to grow in a few days, covering the birds in four to six weeks.

- b. Another feather growth begins at two to three months of age, and a final growth develops when birds become sexually mature.

2. Hens lose feathers (molt) naturally about once a year as part of their natural reproductive cycle.
 - a. Moulting takes place in a particular order.
 - i. Feathers are confined to definite tracts or areas of the body surface, with bare patches of skin between.
 - ii. The first plumage is lost from the head and neck, then from the saddle, breast and abdomen (body), then the wings and then from the tail.

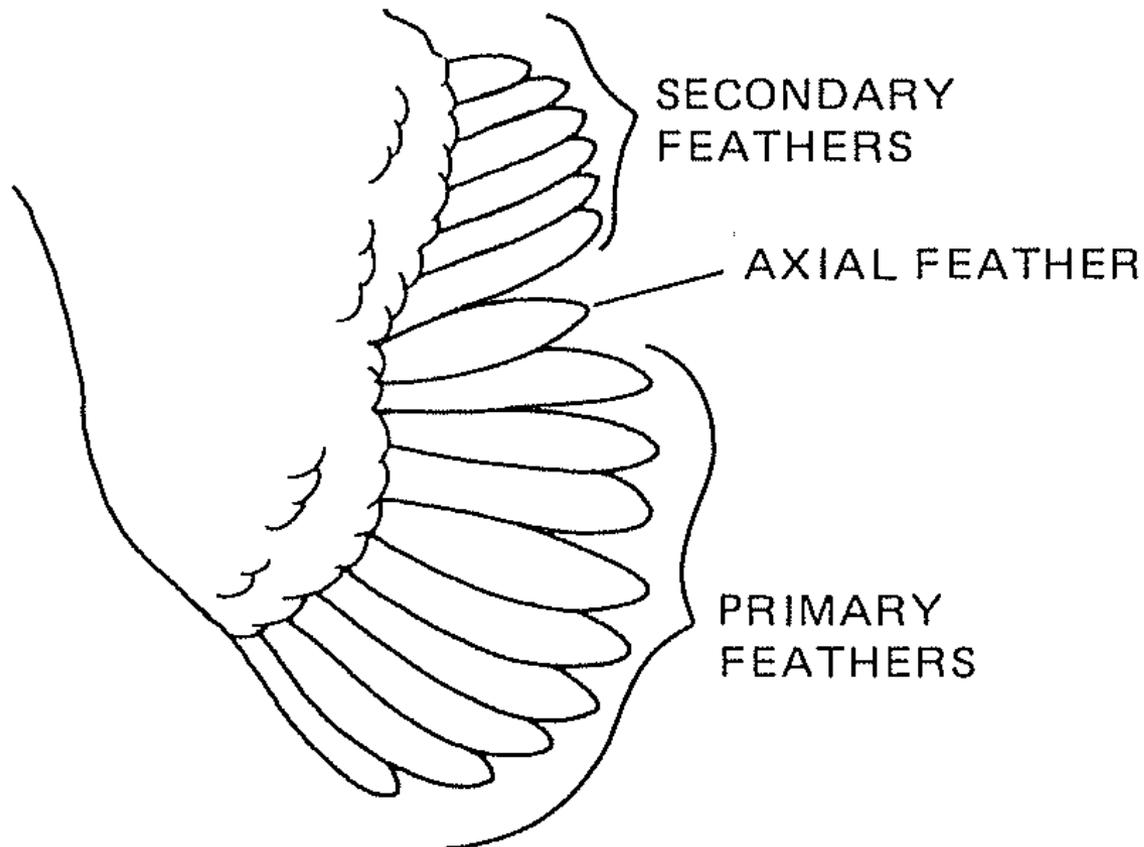
- b. While the first feathers are being dropped from the neck and body, good layers will often keep laying, but when the wing feathers begin to drop, laying usually ceases.



- c. The main wing feathers consist of four tiny finger feathers on the extreme tip of the wing, the 10 large primary or 'flight' feathers, the small axial feather, and the 14 secondary feathers, which are smaller and softer than the primaries.
 - i. When the wing moults, primary feathers are shed first, from the axial outwards to the end of the wing, and then the secondaries, which are not shed in such a set order as the primaries.
 - ii. The number 1 primary feather is first to drop followed by a number 2 and then in order to number 10.
 - iii. While the primaries are being shed the secondaries begin to drop but not in any set order.

- d. The axial feather is dropped at the same time as the secondary next to it.
 - i. The new quill starts to grow as soon as the old feather is out and takes approximately six to seven weeks to grow.
 - ii. The moult is complete when all primary flight feathers on the wing are replaced.
 - iii. The feathers of the moulted bird are large and full, softer, cleaner, brighter and glossy in contrast to the feathers before moulting which were small and hard, dry, frayed and tattered.

There are ten primary feathers on the outer part of the wing. These are separated from the secondary feathers on the inner part of the wing by the axial feather.



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- c. Poultry breeders, however, have developed strains that can molt while continuing to lay eggs.
 - d. Scientists have also discovered that control of lighting can prevent molting in laying hens.

3. Feather patterns and color are used along with skin and leg color, body shapes, combs and beaks to help identify breeds and varieties of chickens.
 - a. Neck and back feathers can also be used to determine the sex of adult chickens.
 - b. The feathers of males have pointed tips and are shinier than those found on females.
 - c. Female feathers have rounded ends.



C. The chicken has two legs and two wings, a fact that influences housing and management.

1. Domestic chickens have essentially lost the ability to fly.

a. Heavy breeds used for meat production cannot do more than flap their wings and jump to a little higher level or move more rapidly along the ground.

b. The lighter-bodied birds can fly short distances, and some can fly over relatively high fences.

2. The feet and shank portions of the legs have scales and most chickens have three or four toes with claws used in scratching.



- D. Respiration rate is higher in chickens than in larger animals.
 - 1. In general, it can be said that the smaller the kind of bird the faster it breathes.
 - a. The male chicken breathes about 18 to 21 times a minute and the female about 31 to 37 times when they are not under stress.
 - 2. The heartbeat of chickens is rather fast, being about 286 times a minute in males and 312 in females in a resting condition.

- E. Digestion rate is somewhat rapid in chickens.
 - 1. It varies from 2 1/2 to 25 hours for passage of food depending on whether the digestion tract is full, partially full, or empty when feed is ingested.
- F. The chicken's temperature is about 41 degrees to 42 degrees C.
- G. Chickens are hatched, not born in the truest sense of the word.

- H. Chickens are covered with feathers but have a few vestigial hairs scattered over the body.
 1. The average consumer does not see these hairs, because they are singed off in the processing plant
- I. The chicken has a beak (or bill) and does not have teeth.
 1. Any mastication occurs in the gizzard.
 2. Many commercial poultry producers do not provide grit to their chickens, because they feed a ground feed of fine meal consistency that can be digested by the bird's digestive juices.

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- J. The chicken has pneumatic bones, making its body lighter for flying, if it had not lost the ability to do so.
 - K. There are 13 air sacs in the chicken's body, again to make the body lighter, and they are a functioning part of the respiratory system.

- L. Chickens have comparatively short life spans.
 - 1. Some live to be 10 to 15 years old, but they are the exception, not the rule.
 - a. In commercial egg production, birds are about 18 months old when they are replaced by new, young stock.
 - b. It takes close to six months for a female chicken to mature sexually and start laying eggs.
 - c. They are kept for 12 to 14 months of egg production. After that their economic value declines rapidly, so they are disposed of when they are about 18 months old.

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- M. Chickens have both white (breast) and dark (legs, thighs, back, and neck) meat.
1. The wings contain both light and dark fibers.

II. The anatomy of a chicken includes a study of both external and internal parts. Both can influence the way birds grow, reproduce and need to be managed.

A. The following external parts help describe the chicken:

- 1. Back.** The back is the dorsal part of the bird between the bases of the wings and from the neck to the tail. It is homologous to the human back.
- 2. Beak.** The hard, protruding portion of a bird's mouth, consisting of an upper beak and a lower beak.

- 3. Body.** The body is homologous to the human torso. It is the bird's main mass not including its appendages such as wings, tails and legs. The body contains all essential organs and a large part of the bird's muscle mass.
- 4. Breast.** The breast is the upper front part of a bird. Underneath the breast is where the major flight muscles are located which are then attached to the wings to help the bird lift its own weight. The muscles are attached to an enlarged breastplate which is a skeletal part unique to birds.
- 5. Cape.** The narrow feathers between a chicken's neck and back.

- 6. Comb.** The fleshy, usually red, crown on top of a chicken's head.
- 7. Ear.** Responsible for maintaining equilibrium as well as sensing sound.
- 8. Ear Lobe.** The soft, fleshy, pendulous lower part of the external ear.
- 9. Eye.** An organ of vision or of light sensitivity.
- 10. Face.** The face is homologous to the human face. It is the front part of the head consisting of the bill, eyes, cheeks and chin.
- 11. Fluff.** The soft feathers of the chicken.

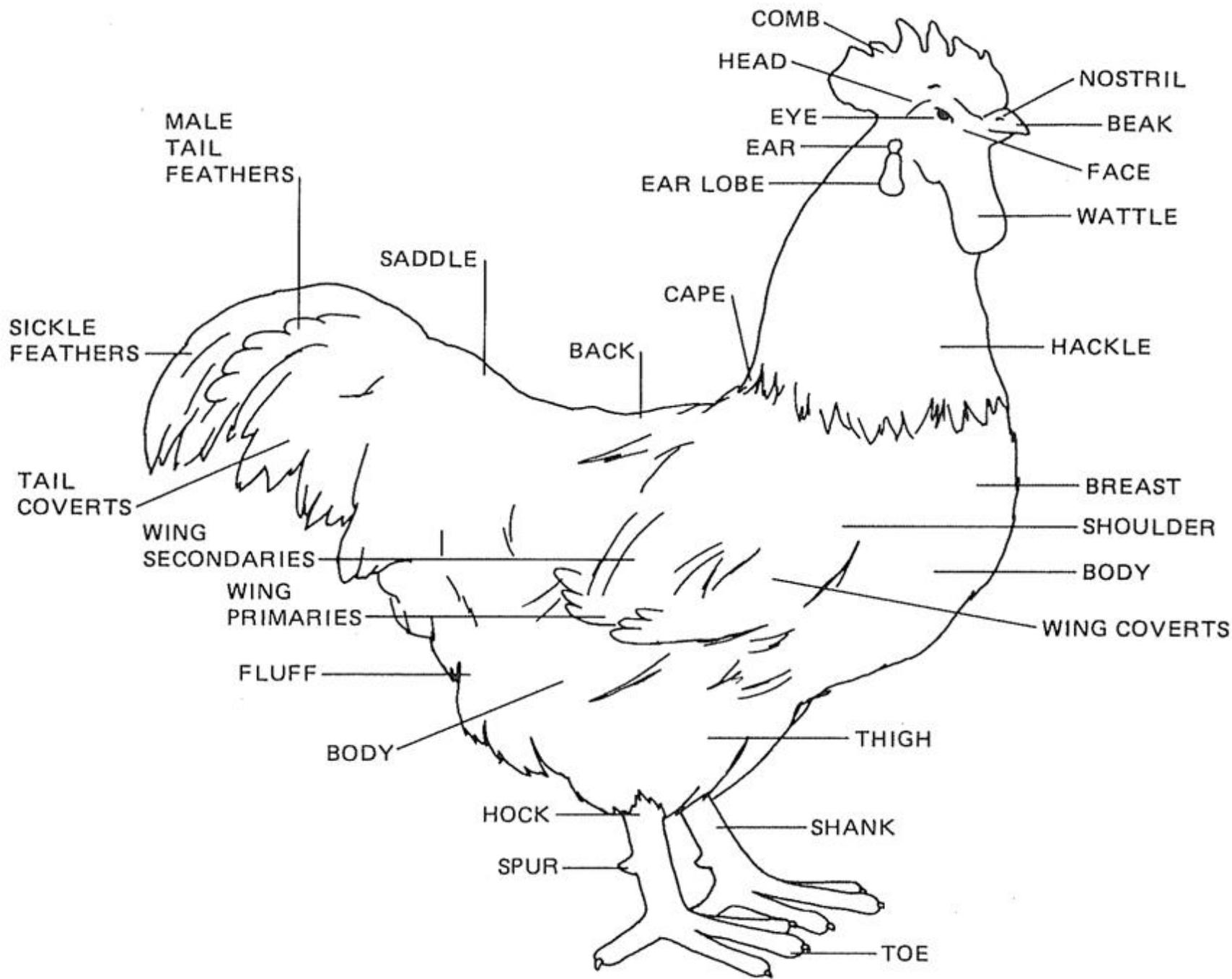
- 12. Nostril.** External openings on the top of the beak and their function is to warm air on inhalation and remove moisture on exhalation.
- 13. Hackles.** A rooster's cape feathers.
- 14. Head.** The head is the upper part of the body, containing the bill, eyes, crown, ears and nose. It is homologous to the human head in terms of content and location.
- 15. Hock.** A joint in the leg of a domestic fowl.
- 16. Shoulder.** The shoulder refers to the relatively short feathers overlying the median secondary coverts on the top of the wing. They are located near the back and can be seen as the “first row” of feathers on the bird’s wing. They are also called marginal coverts and lesser secondary coverts.

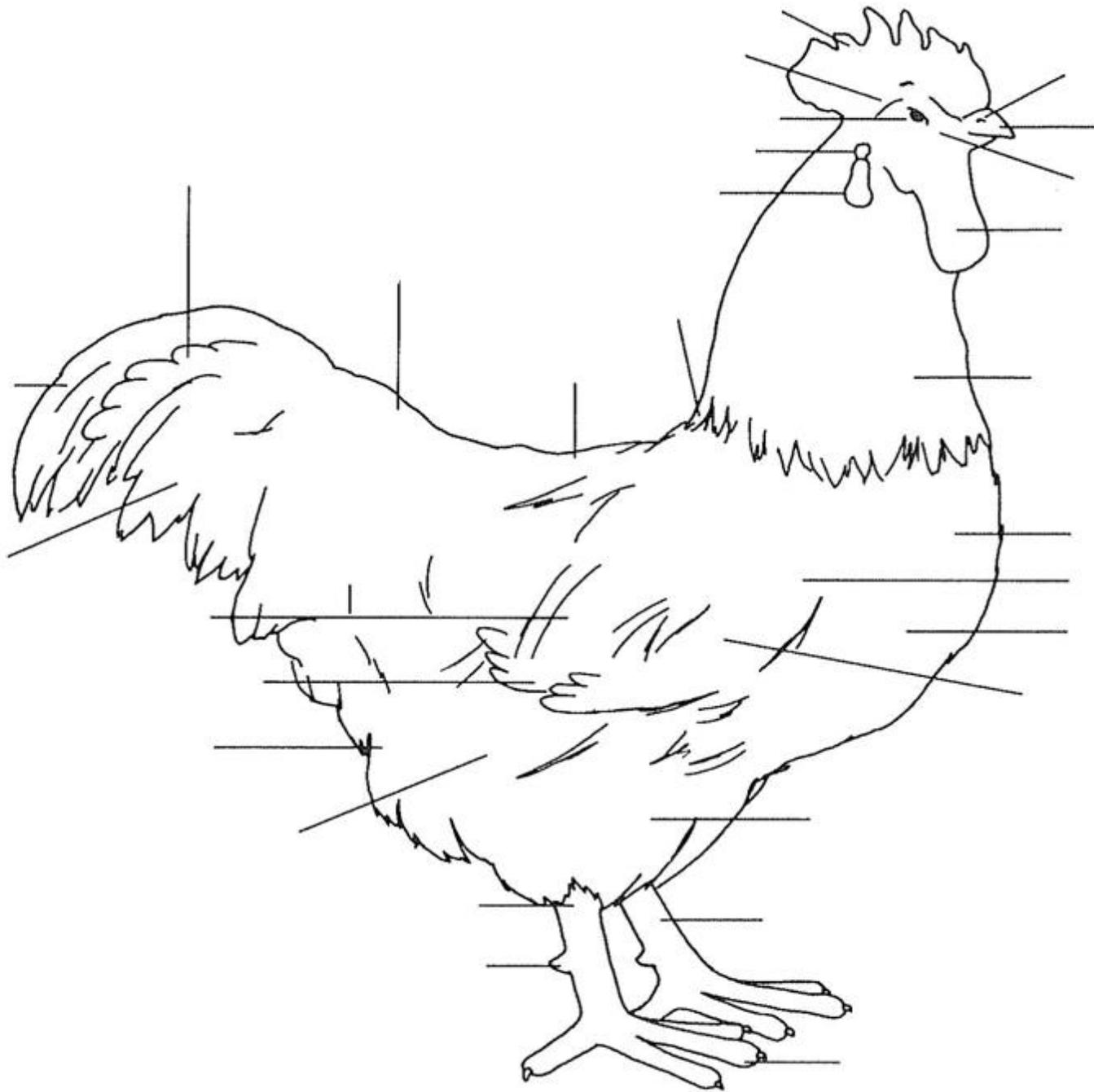
- 17. Sickle Feathers.** Any long, curving feather, as in the tail of a rooster.
- 18. Thigh.** The true femoral region that is hidden by the skin or feathers of the body.
- 19. Saddle.** The part of a chicken's back just before the tail.
- 20. Shank.** The part of a chicken's leg between the claw and the first joint.
- 21. Spur.** A sharp horny growth on the leg of a chicken.
- 22. Tail Coverts.** The tail coverts are the shorter tail feathers covering the bases of the long extending tail feathers.

23. Tail Feathers. The tail comprises of long feathers extending from the rear of the bird and is used for balance and as an asset to attract potential mates. Certain species have extremely elaborate tail feathers, such as peacocks, which serve no other purpose than to convey a positive message to a female during courtship.

24. Toe. The toes are digits attached to the feet just like human toes. Most birds have four toes. The first toe points backwards while the other three toes point forward. The second, third and fourth digits or toes are counted from the inside of the foot out and have 2, 3 and 4 phalanges respectively. Most birds do not have a fifth toe, except for some where it has evolved into a defensive spur, such as in the chicken.

- 25. Wattles.** The two red or purplish flaps of flesh that dangle under a chicken's chin.
- 26. Wing Coverts.** The primary coverts are shorter feathers that cover and protect the primary flight feathers. The secondary coverts are the feathers that cover and protect the secondaries, and are attached to the “elbow”.
- 27. Wing Secondaries.** The secondaries are flight feathers attached to the equivalent of the human elbow. They come behind the primaries in importance and location when viewed from the outermost edge of the wing.
- 28. Wing Primaries.** The primaries are the flight feathers specialized for flight. They are attached to the "hand" equivalent part of the wing.





Review/Summary

- What is the function of the comb and wattle?
- Explain how chickens stay warm and dry?
- What happens when chickens molt?
- What are the different types of wing feathers?
- What are some of the distinguishing characteristics between hens and roosters?
- Explain the life span of a chicken?
- How many external parts of a chicken can you identify?