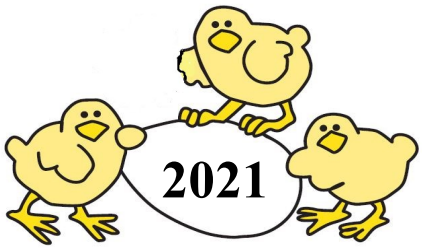
POULTRY

Allen County 4-H
Due June 30 in the Enxteion Office



$1.00

Level 3 – Grades 9 & up

What you will do in this project:

- Enroll in the 4-H program by January 15.
- Complete the project by answering at least two of the activities in this activity sheet and turning it into the Extension Office **by the last business day of June, June 30** or earlier. This activity sheet consists of activities, and a record sheet.
- Attend County 4-H Poultry workshops when offered.
- Refer to the Allen County 4-H Rules Book for a complete listing of all regulations concerning this project.
- You can exhibit in all 10 Classes that are offered, no more than 2 pens per class.
- You may exhibit a Poultry Education poster in addition to the birds.
- All birds must be in your possession by May 15 with the exception of broilers that are hatched at the end of May.
- Complete FairEntry online by published deadline.
- To exhibit beef cattle, dairy cattle, swine, sheep, meat goats, dairy goats, poultry and rabbits, 4-H members must be certified through the Youth for the Quality Care of Animals program. This is an annual program that can be completed via online modules or in-person trainings. For more information about in-person trainings in your county, please contact your County Extension Office. More information about YQCA is available at http://yqca.org/. **Attach a copy of YQCA card.**

Management Tips:

- Provide clean, freshwater to your birds at all times. In the winter, warm (but not hot) water will be needed. Birds on average will drink 1-2 cups a day. Check their water at least twice a day – more often on hot days.
- One chicken eats about 2 pounds of feed each week. 12 chickens eating two pounds a week would eat 24 pounds week. (12 birds x 2 lbs = 24 lbs)
- A feed ration of at least 16% protein for the mature chicken is needed.
- Put at least a 4 inch layer of bedding on the floor for your birds and keep dry. Spread fresh bedding on the top. Clean area completely at least once a year with a solution of 2 tablespoons of chlorine bleach into 2 gallons of boiling water. Scrub with a broom. Ventilate well to dry.
- Birds should be washed before bringing to the fair with a solution of warm water and 2 table spoons of chlorine bleach in a five gallon bucket.

4-H Member: _____ 4-H Club: _____

Grade in School (January 1, 2021) _____ Years in this project _____

Signature of 4-H Member verifying that you have completed these activities:

_____

Signature of Parent that you have reviewed this information:

_____

· 4001 Crescent Avenue · Fort Wayne, IN 46815-4590 ·
(260) 481-6826 · FAX: (260) 481-6439

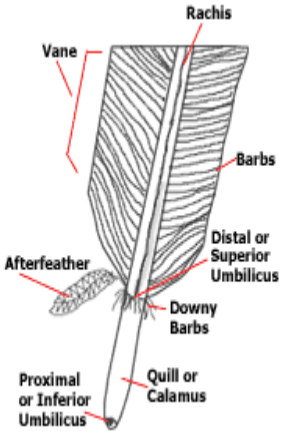
4-H Animal Care:
The Indiana 4-H program strongly supports positive animal care and strongly opposes animal abuse. 4-H is also dedicated to the mission of developing youth and volunteers through “Learning by Doing” programs.
4-H livestock projects teach life skills such as acquiring knowledge, making decisions, and applying leadership skills.

- When working and caring for animals, it is important to insure that appropriate safety measures are in place for both the animals and the persons who care for them. Therefore, there is no substitute for knowledge, common sense, and experience.
- Animal handlers should study and learn to anticipate an animal’s reaction and try and avoid problem situations. It is most important that 4-H members understand an animal’s behavior so one can “outsmart” not “out-muscle” an animal. Foremost in the 4-H’er mind should always be safety of the handler and the animal. Moving animals is more of an art than a science. Movement of animals requires planning and knowledge to accomplish it with the least amount of time, effort and stress to the animal.
- An animal’s good health is often directly related to the environmental factors associated with its living space. The presence of predators, dust, odors, pests, temperature, and humidity has a direct effect on an animal’s well-being.
- Animals react favorably to daily care and comfortable housing. Consideration should also be given to specific animal needs such as size of their housing space, lighting, and ventilation. The best facilities and equipment cannot and should not be a substitute for daily observation and careful attention to signs of illness, injury, and/or unusual behavior.
- Frequent consultation with your veterinarian is a must. Reasonable attention must always be given to the use of drugs and their approved withdrawal times.

Taking Flight

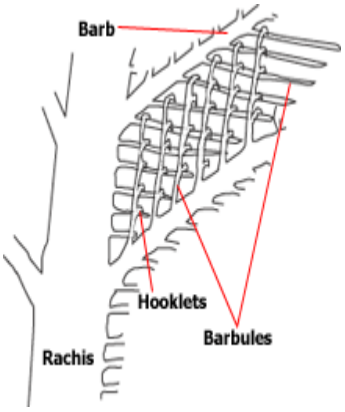
Feathers evolved from the scales of reptiles, and set birds apart from all other animals. Feathers are necessary for flight, insulation, and courtship displays. Feather colors and shapes help us distinguish between different species of birds and, in some cases, between males and females. Because feathers are so different, there are many different anatomical and technical terms used in their descriptions. This article will help you learn some of this terminology and understand more about these amazing adaptations.

Feather anatomy



Feathers are made out of keratin, the same protein found in hair and nails. Feathers have a central shaft. The smooth, unpigmented base, which extends under the skin into the feather *follicle*, is called the **calamus**. The portion above the skin, from which the smaller barbs or branches extend, is termed the **rachis** or **scapus**. On each side of the rachis there is a set of filaments, called **barbs**, which come off at approximately a 45º angle. This portion of the feather that has barbs is called the **vane**. In the larger feathers, these barbs have two sets of microscopic filaments called **barbules**. Barbules from one barb cross the adjacent barbs at a 90º angle. Barbules, in turn, have **hooklets**, sometimes called **hamuli** or **barbicels**, which hook the barbules together, like a zipper, forming a tight, smooth surface. These maintain the shape of the feather. Without these strong linkages, the feather would not be able to withstand the air resistance during flight. The barbs or hooklets may become separated from each other; if this occurs, the bird can reattach them while preening. At the base of the feathers, there are often barbs that are not hooked together. These are called **downy barbs**.

Feathers with barbules and hooklets are termed "**pennaceous**," and one can think of them as the feathers that would be used for a quill pen. Feathers without barbules and hooklets, such as down feathers, are called "**plumaceous**" and have more the appearance of a plume. Some feathers have both pennaceous and plumaceous portions. Some feathers have what are called **afterfeathers**, or **hypopenae**, at the base of the vane in an area called the **distal umbilicus**. These, really, are barbs without hooks, which help trap air and offer some insulation.



Feathers are not arranged haphazardly on the bird, but in major distinct tracts called **pterylae**.

The featherless areas between the pterylae are called **apteria**.

Types of feathers

- As there are different types of hair on furred animals, birds have different kinds of feathers, each having a particular function. The types of feathers include:

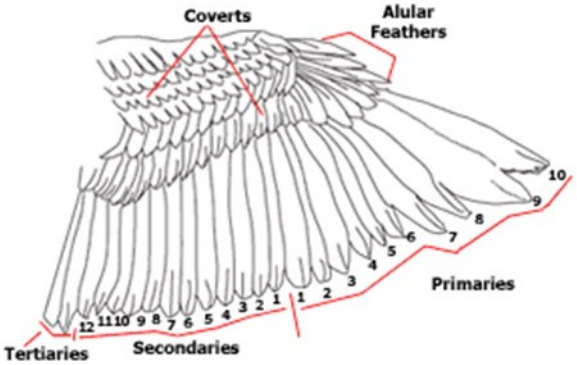
- Feathers with Vanes: Contour and Flight Feathers
- Down
- Filoplume
- Semiplume
- Bristle

Contour feathers: Contour feathers cover most of the surface of the bird, providing a smooth appearance. They protect the bird from sun, wind, rain, and injury. Often, these feathers are brightly colored and have different color patterns. Contour feathers are divided into flight feathers and those that cover the body.

Flight feathers: Flight feathers are the large feathers of the wing and tail. Flight feathers of the wing are collectively known as the **remiges**, and are separated into three groups.

The primaries attach to the metacarpal (wrist) and phalangeal (finger) bones at the far end of the wing and are responsible for forward thrust. There are usually 10 primaries and they are numbered from the inside out.

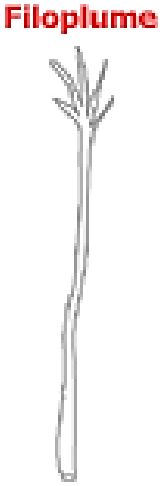
The secondaries attach to the ulna, a bone in the middle of the wing, and are necessary to supply "lift." They are also used in courtship displays. There are usually 10-14 secondaries and they are numbered from the outside in. The flight feathers closest to the body are sometimes called **tertiaries**.The tail feathers, called **retrices**, act as brakes and a rudder, controlling the orientation of the flight. Most birds have 12 tail feathers.



The bases of the flight feathers are covered with smaller contour feathers called **coverts**. There are several layers of coverts on the wing. Coverts also cover the ear.

Down feathers: Down feathers are small, soft, fluffy, and are found under the contour feathers. They are plumaceous, and have many non-interlocking barbs, lacking the barbules and hooklets seen in contour and flight feathers. This makes it possible for them to trap air in an insulating layer next to the skin, protecting the bird from heat and cold. They are so efficient, humans use these feathers for insulation, too, in down jackets and comforters.

There are special types of downy feathers called **powder down feathers**. When the sheaths or barbs of these feathers disintegrate, they form a fine keratin powder, which the bird can spread over its feathers as a water-proofing agent. The powder also assists in cleaning as the bird preens. The absence of powder down in birds such as cockatoos and African greys can be a sign of disease, including beak and feather disease.



Filoplumes: Filoplumes are very fine, hair-like feathers, with a long shaft, and only a few barbs at their tips. They are located along all the pyterlae. Although their function is not well understood, they are thought to have a sensory function, possibly adjusting the position of the flight feathers in response to air pressure.

Semiplumes: Semiplumes provide form, aerodynamics, and insulation. They also play a role in courtship displays. They have a large rachis, but loose (plumaceous) vanes. They may occur along with contour feathers or in separate pterylae.

Bristle feathers: Bristle feathers have a stiff rachis with only a few barbs at the base. They are usually found on the head (around the eyelids, nares, and mouth). They are thought to have both a sensory and protective function.

Feather growth

Like hair, feathers develop in a specialized area in the skin called a **follicle**. As a new feather develops, it has an artery and vein that extends up through the shaft and nourishes the feather. A feather at this stage is called a **blood feather**. Due to the color of the blood supply, the shaft of a blood feather will appear dark, whereas the shaft of an older, mature feather will be white. A blood feather has a larger quill (calamus) than a mature feather. A blood feather starts out with a waxy keratin sheath that protects it while it grows. When the feather is mature, the blood supply will recede and the waxy sheath will be removed by the bird.

Although an adult bird will typically replace all of its feathers during a molt, the loss of feathers is staggered, often over several months, so the bird has enough feathers for flight and insulation. A molt is usually triggered by the change in day length or may occur after breeding. Some wild birds, such as goldfinches, who molt twice a year, change from a bright plumage during the breeding season to a more somber plumage for the rest of the year.

Feather color
Feather color is determined by the presence of various pigments, including melanins, carotenoids, and porphyrins.

- Melanins are brown to black pigments that are also found in mammals. In addition to adding color to the feather, melanins also make the feather denser and more resistant to wear and breakdown by sunlight.
- Carotenoids are generally yellow, orange, or red in color. They are synthesized in plants, and absorbed by the bird's digestive system, and then taken up by the cells of the follicle as the feather is developing.
- Porphyrins are red and green pigments that are produced by cells in the feather follicle.

The next time you look at a bird, you will be able to better understand how its feathers protect it and make it possible for the bird to fly. Down to the microscopic level, you can appreciate the complexity and specialization that make birds such a unique part of the animal kingdom.

Share

How many different types of feathers are there?

List two things that feathers are used for?

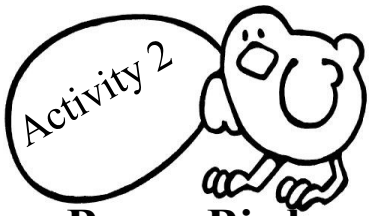
What determines the pigment of feathers?

What are feathers made of?

What are the flight feathers called?

How many tail feathers are there?

What is the rachis?



Boney Birds

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.

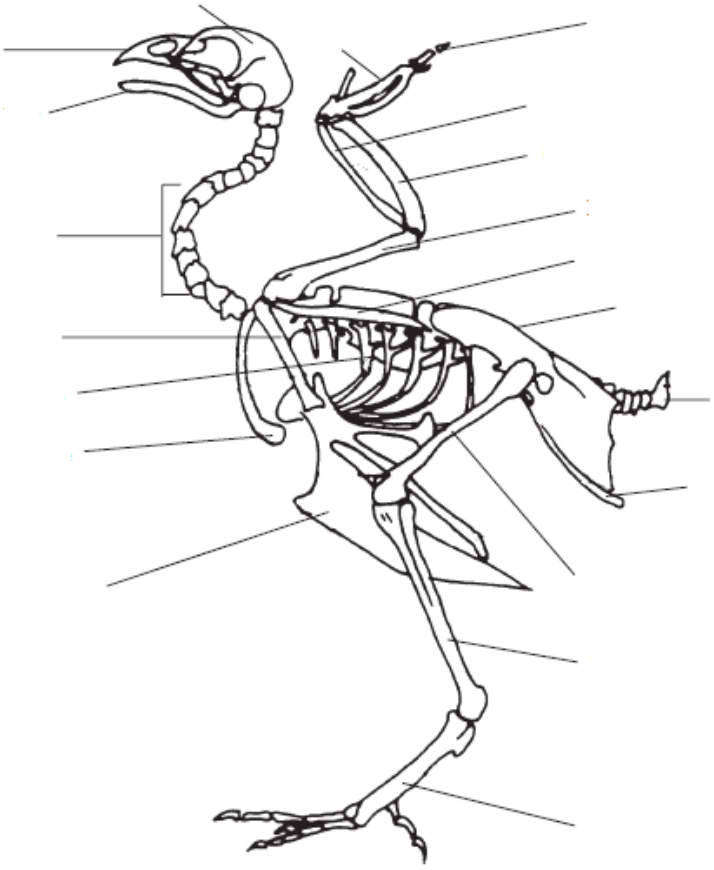
The skeletal system is closely connected to the respiratory system. Some of the bird's bones are hollow and are connected to the respiratory system. Those bones serve as a reservoir for air. This makes the bird lightweight for flight. These hollow bones are called **pneumatic** bones. Pneumatic bones 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. 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 contracts as the bird breathes.

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?

Use the word bank below to identify the bones of this skeleton.

skull	phalanges	sternum	metacarpus	coracoid
ulna	clavicle	radius	cervical vertebrae	humerus
mandible	femur	scapula	incisive	ilium
rib	tail bone	pubic bone	metatarsus	tibia



Share:

1. What bird skeleton parts did you already know? Why?

2. What bird skeleton parts were hard to identify? Why?

3. What are pneumatic bones and what do they do?

4. What are medullary bones? List them.

5. How is a bird's skeleton adapted for landing purposes?

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

7. What bird characteristics do you think were important in helping to develop the airplane?

8. What helps the birds fly?

9. What are bipeds?

10. How many ribs do birds have?

11. How will what you learned from this lesson help you in the future?

Predator

Predation is not common in commercial poultry production. However, predation is a big concern for backyard flocks and organic poultry producers. The reason for this difference is in the way flocks are housed and managed. Commercial poultry producers maintain flocks within buildings for their entire production cycle. These buildings are usually constructed with concrete foundations and a complete roof, and open areas are enclosed by fine net-meshing (i.e., broilers and turkeys) or enclosed entirely by metal siding (i.e., layers). Commercial flocks are at risk from small predators and birds of prey when the building structures are not maintained. Backyard flocks, maintained by small farmers, hobbyists, and youth, are usually housed in existing barns that may not be adequate for keeping predators out. In addition, they may not be housed at all, allowing the birds to free-range and take cover under existing structures. Organic operations are also prone to predation if birds are raised free-range, where they are allowed to graze. Flocks are at the highest risk especially during the night, if they are not provided with any enclosed structure for protection.

Playing Detective

In many instances predators leave clues to their identity when they have visited a poultry house. From these clues the poultry producer may be able to identify the culprit and take the necessary steps to prevent a reoccurrence.

Dogs A dog usually kills chickens for the sport. Several dead birds with much mauling of the carcasses is usually evidence of a dog. Dogs usually visit the chicken pen during daylight hours rather than at night.

Mink-Weasel Birds usually show signs of attack on the sides of the head if a mink or weasel has visited the poultry house. With these predators, several birds will probably be killed and piled neatly together. The back of the head and neck are frequently the only parts of the carcass consumed.

Raccoon If a predator visits only once each 5 to 7 days and eats the head and the crop of the dead birds, a raccoon is probably responsible. Sometimes more than one bird will be killed at each visit.

Opossum The opossum generally attacks only one bird at each visit. Usually, the bird's abdomen has been eaten. Eggs may also be the object of the opossum's raid on the chicken house.

Owl The only likely culprit here is the great horned owl, which does sometimes attack poultry. One or two birds are usually killed, with the talons being used to pierce the brain. The owl will usually eat only the head and neck. Feathers found on a fence-post near the chicken house or pen may provide an additional clue.

Fox-Coyote The old sayings about the sly fox were not by accident. The fox and the coyote are very smart and difficult to catch in the act of raiding the flock. Since birds are frequently carried away with little evidence left behind, the only way of determining losses may be a head count. Visits from these predators will usually be very early in the morning. Keeping birds in a secure pen or poultry house until late morning is good insurance against losses from a fox or coyote.

Skunks Skunks do not usually attack adult birds. They may kill a few chicks and eat the abdomen. Eggs may also be the targets. If skunks have been in the poultry house the odor is usually a clue.

Humans Unfortunately, there can be problems from people as well as animals. If birds are missing with very little evidence, particularly from a predator proof pen or house, the possibility of humans being involved should not be over-looked.

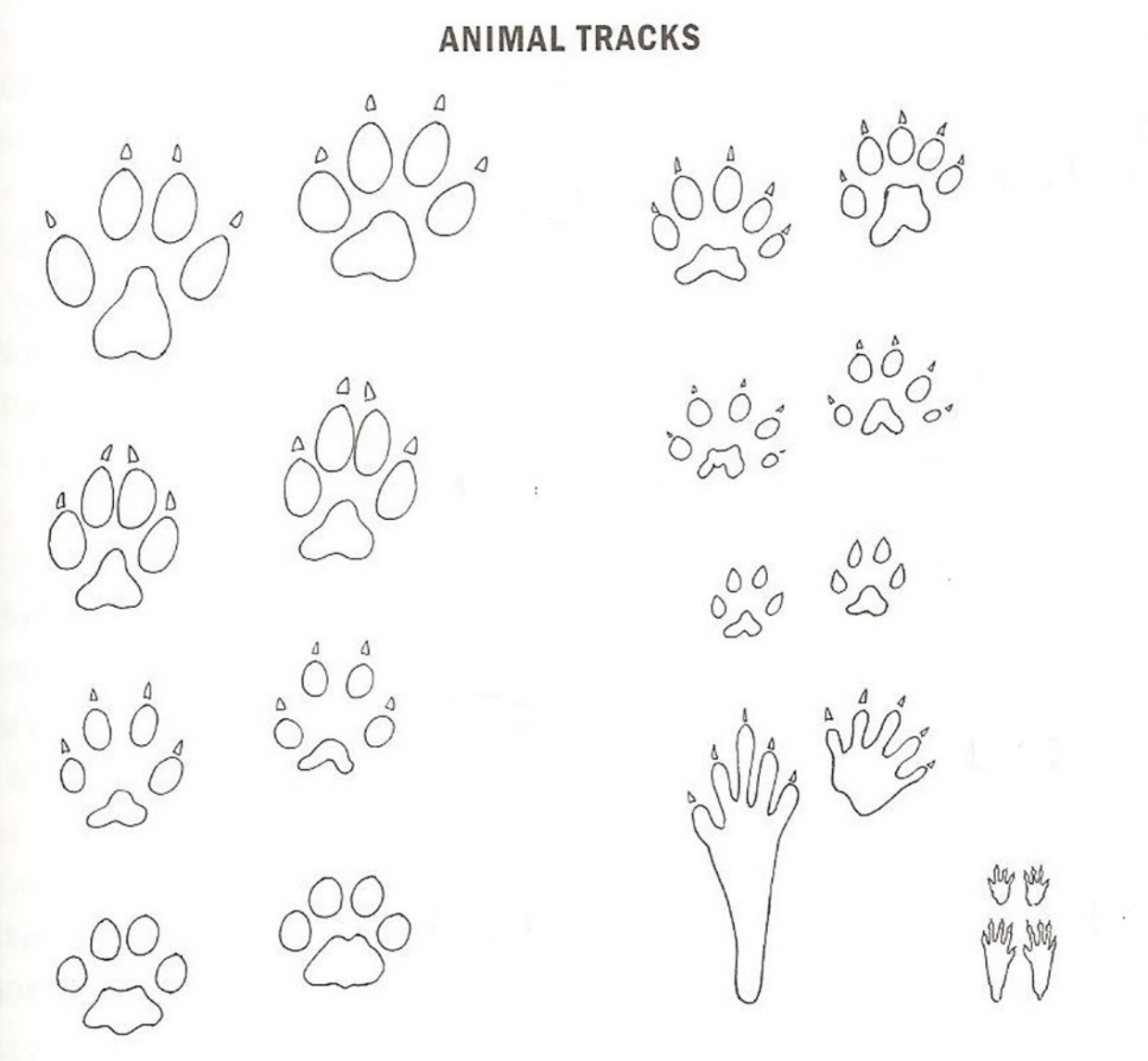
Preventing Repeat Visits

Determining the identity of the predator is essential in preventing repeat visits. Once identification has been made, appropriate steps can be taken. Eliminating the point of entry is the first deterrent and eliminating the source of the problem by trapping or other means is the second. Trapping should be done properly to minimize the chances of catching an innocent animal. Seeking advice from a wild-life specialist is desirable if individuals have no experience with trapping. Again, prevention is the best solution to the predator problem.

Using the information you learned above to answer the questions

Clue	Likely Time	Predator
Bites in the breast, thigh or abdomen	Night	
Chicks killed, abdomen eaten with lingering smell	Night	
The rear end bitten and intestines pull out	Night	
Dead bird missing head or neck	Night	
Bird missing a few scattered feathers or no clue	Dusk or Dawn	
Birds mauled or not eaten, fence or gate torn	Any time	
Backs bitten, crops eaten, birds pulled into a fence and partially eaten, body pulled away from houses	Night	
Baby chicks or eggs missing no clue	Day	
Birds missing no clue	Any time	
Digging around the outer edges of the fence	Any time	

Label the animal tracks with the animal that would have made the print.



ALLEN COUNTY 4-H POULTRY RECORD

Records serve as a way to measure your own success with a project. When answering these questions, you should be able to see where improvements can be made for next year and if you wish to continue with this project for another year.

Commercial					
Class	**Breed**	**Date Purchased**	**Number Purchased**	**Cost of Birds**	**Number of Birds Dead/Lost**
Broiler					
Turkey					
White Egg Layer (Over 6 Months)					
Colored Egg Layer (Over 6 Months)					
White Egg Pullet (Under 6 Months					
Colored Egg Pullet (Under 6 Months)					

Exhibition					
Class	**Breed**	**Date Purchased**	**Number Purchased**	**Cost of Birds**	**Number of Birds Dead/Lost**
Standard Exhibition					
Waterfowl					
Clean Legged Bantams					
Feather Legged Bantams					

List the equipment/housing arrangements needed for your project. Include feeding equipment, bedding, housing, grooming tools, etc. that you use to care for your animal(s).

Item	Approximate Value

List the items you feed to your animals. Include type of feed, quantity, costs		
Type of Food	Amount Fed	Expense - Value of Feed

List veterinary expenses you had with this project (vaccinations, illness, health certificates, etc.)

_____

_____

List three new things you have learned about raising birds.

a. _____

b. _____

c. _____

What resources did you use to gain more information about your animals? (List people, magazines, newsletters, web sites, etc.)

_____

_____

Did you give a demonstration in your local 4-H Club? Yes _____ No _____ If yes, list the date given, title of demonstration and number of people present.

_____

_____

List any tours, workshops, clinics, etc you participated in relating to this project.

_____

_____

_____

You may exhibit in all ten classes offered
Two Pen per Class.

Educational Poster exhibit is due and judged on designated date in exhibit building, Watch the Clover Chronicle for this date.

***** Copy of Receipt Showing date of purchase MUST be attached to these pages for Broilers, Pullets and Turkeys.***

I understand that the 4-H Livestock Committee may assign a specific location or pen for my animal(s). I understand that I may be subject to additional pen fees due upon time of unloading for my animals.

I further understand that to exhibit at the Allen County Fair is a privilege and that I must adhere to all rules and regulations set forth by the Indiana Board of Animal Health for Exhibition, by the Purdue Extension Service 4-H Youth Development program and the Allen County 4-H Clubs, Incorporated.

4-H Member Signature:_____ Date: _____

____ Completed v2.4honline enrollment by January 15, 202`

____ Completed Fair Entry on line by June 30, 202`

____ Copy of YQCA Certificate attached