

Ages:

8 & up

Exploring Skeletons

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Main idea: Many students have absolutely no idea what their favorite chicken pieces are, from an anatomical standpoint. It might be difficult to get a reptile to dissect but this is a tasty way to learn some anatomy that correlates well with the vertebrates.

Objective: Introduce skeletal anatomy of vertebrates without problem of "icky dissection" and make some correlations with different vertebrates.

Materials:

- q Cooked whole chicken
- q Illustration/photos of human, bird, and reptile skeletons
- q Right Before Your Eyes mini-poster about white vs. dark meat (see following pages)
- q Crayons
- q Rubber gloves.

Motivator: Students get to eat the dissection as they relate it to their own experience.

Questions: Before the activity, ask the students:

q Do you think a chicken, a human, and a lizard have similar skeletons (bones)? A: Yes, many of the bones are very similar and are even named the same. Look at the illustrations for comparison.

q Can you think of any differences? A: The proportions are different for different animals and even the shape may be quite different. Also, bird bones are hollow and light (so they can fly) compared to mammals and reptiles.

q When you eat chicken, exactly what are you eating? A: Meat = Muscle!!!

q What about those chicken pieces you get at fast-food chicken places? (The ones with the bones in them.) They don't look quite the same! A: These pieces don't look like what you'd expect since they cut the portions up in a way that maximizes edible pieces. Portions served may consist of more than one body part.

Activity:

Skeletons of Mammal/Bird/Reptile Illustration (handout): Have the students can find the same bones (e.g. Femur) on the different illustrations and color them the same color. This makes it quick and easy for them to see the differences at a glance. Enlarge the skeleton illustrations to make it easier for

coloring.

Exploring chicken skeleton: Leader should cut up the chicken and have the students eat portions then ask them to set the bones aside for identification. Look at the various bones and compare them with the illustrations. For many of the children, they'll never have associated their favorite piece of chicken with an actual body part. Discuss too, the difference between white and dark meat. (See “Right Before Your Eyes – Dark or Light” on the following pages.) Often there are bits of arteries/veins and even nerves that are visible. So as the children eat, they should be on the lookout for these.

Learning checks: Have the students identify:

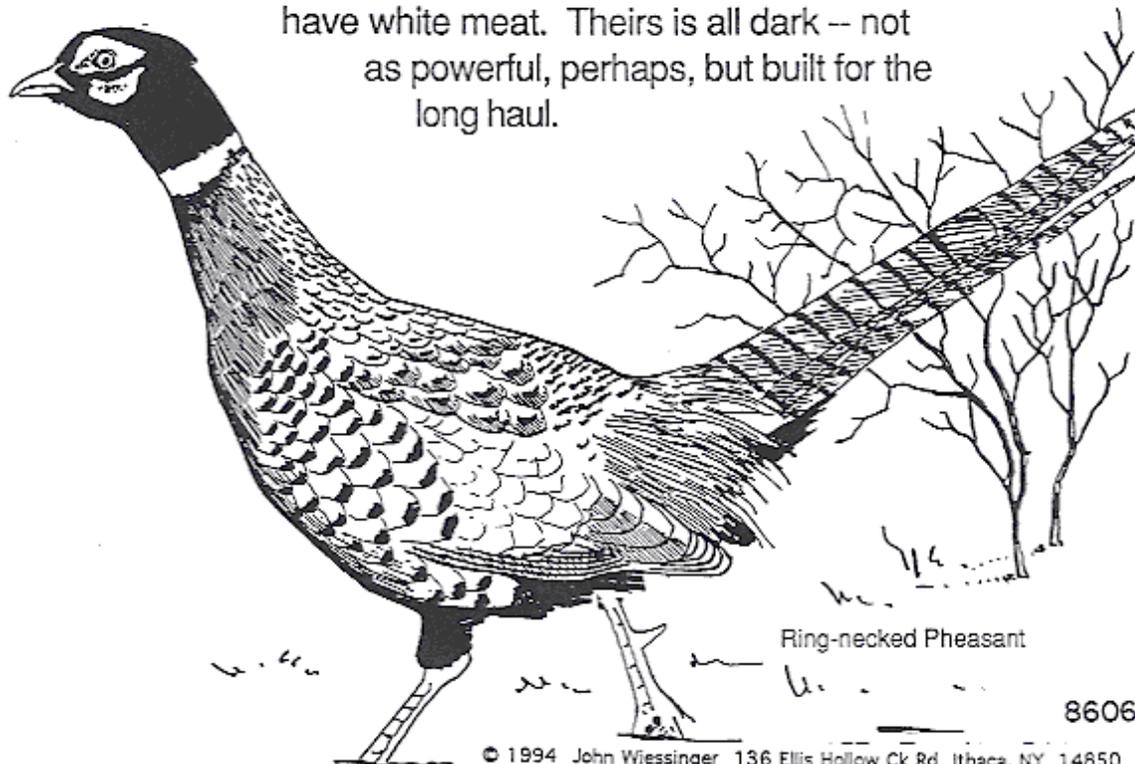
- q Thigh - Femur (FEE-mir)- upper leg
- q Drumstick - Tibia (TIB-e-ya) and Fibula (FIB-u-la) - lower leg
- q Breast - Sternum (STIR-num)and ribs -chest
- q Wishbone - clavicle (CLAV-ih-cal) collar bone
- q Wing - Humerus (HEW-mer-us) upper arm; Radius (RAY-dee-us) & Ulna (UL-na) lower arm, and Hand
- q Pelvis (PELL-vis) – hip

Background: See “Right Before Your Eyes – Dark or Light” , [this link](#) Drawing by John Wiessinger, Diagram from Terres, J. (1980). The Audubon Society Encyclopedia of North American Birds. New York: Alfred Knopf Publisher.

Dark or Light?

**Do you prefer dark meat or light?
Ever wonder why you have a choice?**

Birds like pheasants, quail, grouse, turkeys, and chickens have two kinds of muscles, dark and light. The white (breast) muscles provide powerful bursts of flight but tire quickly. The dark meat (legs), by contrast, provides sustained activity. It's no wonder that a pheasant would rather run than fly. Birds which migrate or make long flights, like ducks, hawks, crows and robins, don't have white meat. Theirs is all dark – not as powerful, perhaps, but built for the long haul.



Ring-necked Pheasant

8606

RIGHT BEFORE YOUR EYES - Dark or Light?

The power that makes it possible for a bird to fly is concentrated in its pectoral or breast muscles. These muscles constitute 15-25% of the total weight of the strongest flying birds. (The Ruby-throated Hummingbird has breast muscles which make up about 30% of its weight!) Aerodynamics aside, it's easy to see why humans will never be able to fly. Our pectoral muscles are far too puny to provide the lift necessary to get our bodies off the ground!

The two types of muscles found in some birds are distinctly different in structure, function, and even taste. (And any cook can tell you that there are differences in how they cook!) Many of the gallinaceous (gal-ih-NAY-shus) or chicken-like birds have well-developed white breast muscles, that means they are unable to undertake long flights. Hunters can attest to just how explosive and powerful their short flight is, however! The Ruffed Grouse, known for its powerful takeoff, makes an average flight of only 300 to 600 feet and if flushed (chased) several times in succession, it is reported that it can be picked up by hand, too exhausted to fly further!

The red (dark) muscles are constructed of finer fibers than the white. The darker color of the red fibers is due mainly to the presence of oxygen-carrying compounds which are absent or rare in the white muscles. The red fibers also have a greater blood and fat supply. (If you are watching your fat consumption, eat white meat rather than dark.) It is interesting to note that the dark muscles, like our own, respond to inactivity by decreasing in size; the white muscles are not affected very much by disuse, which is why our Thanksgiving turkeys have ample breast meat in spite of their flightless lives.

It is easy to see that birds are greatly affected by the kinds of muscles they possess. Their flight, migration patterns, habitat preferences, courtship displays, and method of feeding are all directly affected by their musculature.

How can the birds with two kinds of muscles get along without much flying? These birds feed on the ground and use their powers of flight only for escape or for flying to roost. The leg muscles of these birds are particularly well developed for walking and scratching, but flying doesn't occupy a big part of their day.

What about the people who "pump iron"? Aren't their pectorals almost as powerful as a bird's? They have more muscle bulk than the rest of us. But those muscles still attach to a scrawny little breastbone - our sternum. The sternum (keel) of most birds is a narrow but very deep bone, allowing for massive muscle attachments and capable of withstanding tremendous muscle contractions. Look for it the next time your family cooks a whole chicken. Ounce for ounce, a bird will outdo Arnold Schwarzenegger every time!

Terres, J. 1980. Audubon Society Encyclopedia of North American Birds. A. Knopf, NY.
Welty, J. 1981. Life of Birds. W.B. Saunders Co., Philadelphia.

