

Inquiry Question

How are bird wings similar to your arm?

Name: _____ Date: _____



Although there are many differences between your body and a chicken, there is one structure that shows similarities.

This structure is your arm and the chicken's wing.

In this lab you (and a responsible adult) will be discovering the similarities by doing a dissection.

General Instructions

The end goal of this project is to be able to observe the similarities and make connections to our own bodies. Thus, it is important to follow the directions in this experiment carefully.

Materials you'll need:

- dissection tray & instruments
- fresh chicken wing
- gloves
- goggles

Hints and Ideas:

- Attached is the dissection instructions and worksheet.

Project submission:

Complete the attached activity pages detailing your observations and answering the lab questions. Submit your completed work to the Biology project drop box.

Name: _____ Date: _____

Chicken Wing Dissection

How do the muscles, bones, and tendons work together to move a joint of a chicken wing and how do they compare to a human arm?

****Warning: this lab should be done with a responsible adult****

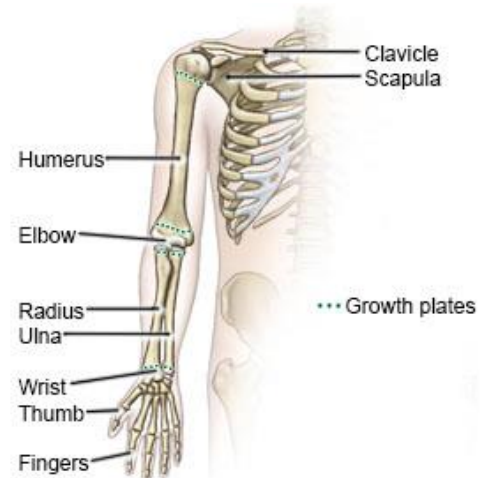
Can you believe that a bird's wing is very similar to our arm? In this activity you will study a chicken wing structure and function, which is actually like your arms.

Bones of the Human Arm:

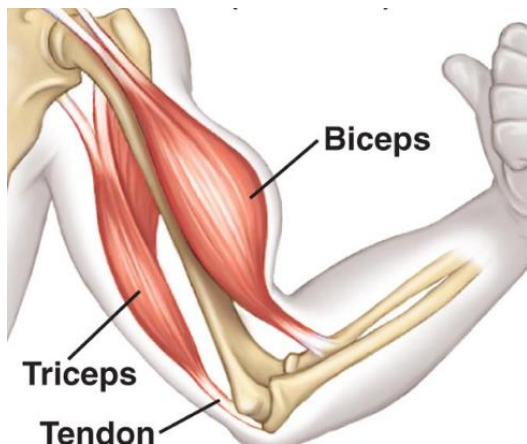
Our arm reaches from the shoulder to the wrist. It consists of two parts:

- (1) The upper arm, which starts at your shoulder and goes all the way to your elbow, and
- (2) The forearm, which starts at your elbow and goes to your wrist.

Your upper arm is made from one long bone that we call the humerus. The top of the humerus is round and fits like a puzzle into the rounded scapula, which is the shoulder bone. This forms a ball-and-socket joint and allows for the arm to move in a circular motion.



Your forearm is made up of two bones called the radius and the ulna. The ulna doesn't move at all; however, the radius rotates around the ulna. When you twist your forearm, the bones are like a screwdriver being twisted.

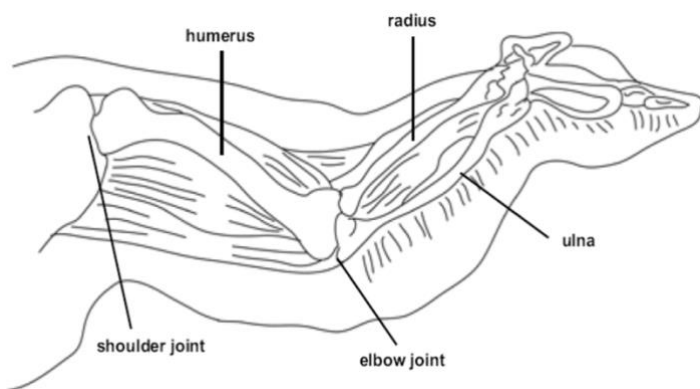


Skeletal Muscles of the Human Arm:

Skeletal muscles are responsible for hundreds of movements. When we want to move, a signal is sent from the brain to these muscles. Then the muscles will contract or get shorter.

There is a tissue that connects the muscles to the bones, they are called tendons. When a muscle that connects two bones gets shorter, the bones are pulled closer together. For example, there are tendons that are attach your bicep your shoulder and some that attach it to a bone in your forearm. When the bicep muscle shortens, your forearm bends towards your shoulder.

The skeletal muscles often work together to produce smooth, controlled motions by pulling or contracting. When one muscle in the pair bends part of the body, the other muscle extends or straightens part of the body.

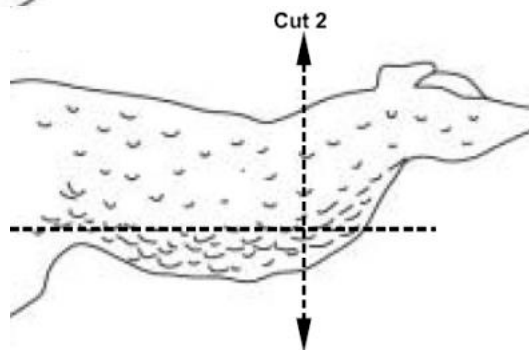
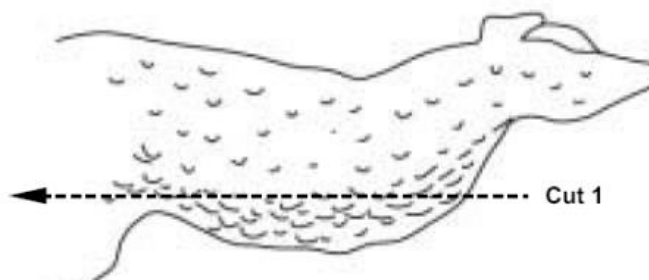
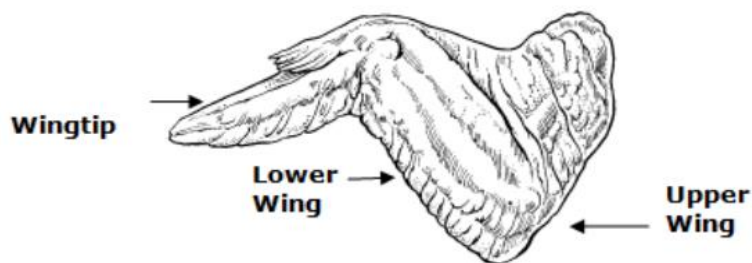


Bones of the Chicken:

The upper wing consists of a humerus, which is at one end, and the ulna and the radius at the lower wing. These bones connect at the elbow joint. The rest of the wing is made of modified hand bones.

Getting Under the Skin:

- (1) Examine the chicken and compare it to the figure to the right.
- (2) Identify the upper wing, the lower wing, and the wing tip.
- (3) Examine the wing at the point where it was removed from the body. Depending on the way the wing is cut, you might see cartilage and bone marrow.
- (4) Using the scissors, cut down the middle of the skin, starting at the top end of the upper wing. Try not to cut through the muscles below the skin (*HINT*: pierce the skin then slip the scissors between the skin layer and the muscle). Cut till you reach the shoulder joint, see cut 1 in figure 1.5.
- (5) Cut down the sides of the skin to make a T-shaped cut, as seen in figure 1.6. Start where you made the first cut and slowly cut away from it going one way, then do the next. Peel the skin and to loosen it you can cut along it (*NOTE*: the chicken skin can be difficult to remove. Take your time peeling it back so that you don't damage the tissues under it).



Observations:

Use the observation guide provided below to help fill out the table below.

Fat: Look for yellowish tissue clumped together beneath the skin. This is fat tissue, made of fat cells.

Muscles:

- a. Observe the muscles in the wing. They look like bundles of pale pink tissue.
- b. Find two muscles in the wing that bend and straighten the elbow joint. Each muscle pulls on the lower wing bones in one direction (the flexor bends the joint). Since the flexor cannot lengthen by itself to push the bone back to straighten the joint, another muscle pulls the bone in the opposite direction (extensor).
- c. Hold the wing down at the shoulder and alternately pull on each muscle. Observe what happens.

Tendons

- a. Tendons are shiny white tissues at the ends of the muscles that attach muscles to bones. Find as many tendons as you can on the chicken wing.
- b. Pull on a tendon to see how it helps the chicken move its wing.

Joints and Ligaments

- a. Two bones come together at a joint. Bend and straighten the elbow joint and observe how the bones fit together.
- b. Ligaments connect bones to other bones at joints. They look like a shiny white covering of the joint surfaces.
- c. Closely examine the elbow joint between the upper wing and the lower wing and identify the ligaments.

Tissue	Description (colour, texture, etc.)	Tissues it attaches to
Skin		
Fat		
Muscle		
Tendon		
Ligament		
Cartilage		

Analysis:

(this does not need to be done in complete sentences)

1. What is the purpose of connective tissue?

2. What type of tissue actually moves the chicken wing?

3. Why are tendons important?

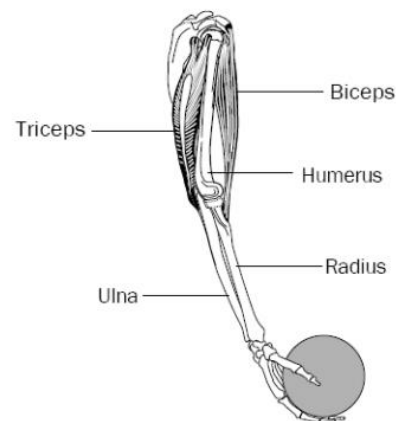
Making Connections to your Body:

With your left-hand grab something that is heavy (textbook, pencil case, ect) and hold it at your side. Place your right hand on your upper left arm so that you can feel your muscles move. Slowly bend your left arm to raise the weight. Once raised, you can slowly lower the weight and straighten your arm. Repeat this action a few more times, can you feel something happening?

4. What joint did you use to lift the weight?

5. Explain which muscle contracted and which muscle extended as you raised the weight.

6. Which bone in the arm moved?



Definitions: *(write the definitions of the following in your own words)*

7. Muscles: _____

8. Tendons: _____

9. Joints: _____

10. Label the both the human arm and the chicken wing using the following:
- a. Bicep
 - b. Tricep
 - c. Lower arm
 - d. Upper arm

