



Curiosity Guide #603

Muscular Science

Accompanies Curious Crew, Season 6, Episode 3 (#603)

Arm Model

Investigation #3

Description

Make a working model of the muscles in the arm!

Materials

- Arm bone and muscle template, found online
- Cardboard
- String
- 8 brads
- Pushpin
- 4 sewing bobbins
- Glue
- Tape
- Scissors
- Stand

Procedure

- 1) Print the paper bone and muscle template. Cut the pieces apart at the elbow joint.
- 2) Mount both parts on cardboard with glue. Cut away the extra cardboard.
- 3) Pierce the cardboard with a pushpin at the elbow. Make two more piercings above and below the elbow joint.
- 4) Slide a brad through the upper and lower hole. Tie a 24-inch length of string under the head of each brad before tightening the clasp.

- 5) Loosely attach the upper and lower arm sections at the elbow with another brad.
- 6) Cut a rounded part of cardboard to represent the shoulder.
- 7) Pierce two holes through the upper arm, one above the biceps and the other above the triceps, as well as one in the center that also goes through the cardboard shoulder.
- 8) Place a bobbin over each muscle piercing. Slide a brad through the bobbin and the upper arm. Fasten the brad in place.
- 9) Thread the string clockwise once around the bicep bobbin and counterclockwise around the triceps bobbin.
- 10) Place the center shoulder brad through the upper arm and shoulder and loosely fasten the brad so that the joint can rotate.
- 11) Pierce two more points three inches into the shoulder cardboard. Press the final two brads through the remaining bobbins and fasten in place.
- 12) Thread the string clockwise once around the bicep bobbin and counterclockwise around the triceps bobbin.
- 13) Pull the ends of each string.
- 14) What do you notice?
- 15) Attaching the model to a stand can make the model easier to operate.

My Results

Explanation

Muscles work in pairs and shorten to cause bones to move. The muscles are attached to the bones with tendons, but the muscles themselves are made of many fibers that can overlap to contract. This means muscles must work in opposite directions. Flexing the bicep muscle will raise the lower arm, while flexing the triceps will straighten the arm out. We see this motion when we pull the strings on the model to represent how the muscles contract. While one muscle group shortens, it pulls on the bones and causes them to move, while the other muscle group is relaxed and stretched out. The string, too, shortens just as the muscles do.

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