**Arm Model Activity**

**Objective: To demonstrate your knowledge of levers, joints, muscles, and bones by creating an arm model and**

**Background information:**

**List four things you know about the human arm.**

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**Materials:**

per group or per student

* one 25 cm piece of mat board (upper arm)
* one 35 cm piece of mat board (lower arm and hand)
* one 20 cm piece of mat board (strengthen the upper arm piece)
* clear tape
* 2 brads
* 2 pieces of string, about 40 cm each
* masking tape
* hole punch

**BUILD**

**Procedure:**

1. **Draw the bones that are found in the arm on your pieces of board.**

* The bone in your upper arm goes on the shorter piece of board.
* The bones in your lower arm, wrist, and hand go on the longer piece of board.

1. **Tape your extra piece of board to your upper arm to reinforce it.** 
   * Match the edges to where the elbow joint is
   * Tape the boards together so that it is one board thick where your shoulder is located.
2. **Tape the lower arm to the upper arm to make an elbow**
   * Tape the arm together: Lay the upper arm over the lower arm so that they overlap by about 2 cm.
   * Tape the front side of the arm pieces together
   * Fold your arm model together so that your upper arm is touching your lower arm
   * Tape the backside of the arm pieces together to complete your elbow
3. **Poke your brad into your lower arm about 3 cm from the elbow** 
   * use a pencil or push pin to start your hole for your brad, widen the hole until your brad fits through
4. Hole punch a hole in the top of your upper arm where your shoulder joint would be
5. Tie a piece of string to your brad on the frontside of your arm, put the other end of your string through your shoulder joint hole going from front to back. Label the string with masking tape “Bicep”

Tie a piece of string to your brad on the backside of your arm and put the other end of your string through your shoulder joint hole from back to front. Label the string with masking tap “Tricep”

Brads

0

Tricep

Bicep

**EXPLORE**

**Muscles work in pairs. One muscle contracts while the other relaxes.**

**Holding onto where the shoulder of your arm model gently pull both the bicep and tricep strings at the same time. Describe what happens to your arm model when both strings are pulled.**

Rotate your arm around to discover the optimal position to get the most movement from your model when using the bicep string. Draw the position that worked the best.

Rotate your arm around to discover the optimal position to get the most movement from your model when using the tricep string. Draw the position that worked the best.

**A. DRAW!**

Directions: In the box bellow draw an image of your arm model. Include the bones drawn on the boards, strings, and joints.

**B. LAB DISCUSSION QUESTIONS:**

Directions: Answer each question in complete sentences rephrasing the question in your answer, looking at the diagram to guide your thinking.

**LEVERS:**

1. Looking at your diagram, what parts of the diagram look like a lever?
2. Label the fulcrum of your lever on your diagram. Add a load of a small box to your hand of your model.
3. Look at the muscles. What two places on the arm do the bicep muscle attach onto the bones of the arm?
4. Looking at your bicep of your arm working with the bones is it a first, second, or third class lever? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think that it is that class lever?

1. Label the effort and load on your diagram for a lever with your bicep.

**JOINTS**:

1. Label and locate the three types of joints found in your arm on your diagram. Include the joints found in wrist, elbow, and shoulder.
2. Describe the directional movement of your elbow joint?
3. What joint type did you learn about that is missing from your arm?

**MUCSLES/BONES:**

1. Label your diagram with the muscle(s) you created.
2. What type of muscle is found in your arm? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Are the muscles in your arm voluntary or involuntary?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Explain why muscles work in pairs. Think about when you pulled both strings at the same time.
5. What did you need to do to get the tricep muscle to work?
6. Label the bones in the upper arm, lower arm, wrist, hand and fingers on your diagram.