



Mighty Muscles Model!



How do muscles work?

Have a go at making a model of how muscles work as pairs!

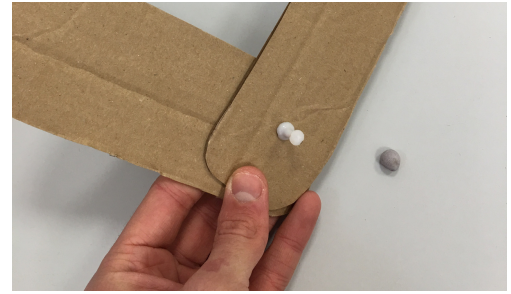
You will need:

- Card
- Scissors
- Rubber bands
- Push pins
- Blue Tack
- Adult supervision

Step 1) Cut two rounded rectangles from the card. Cut a hand shape at one end of one (as in step 4).



Step 2) Adult help needed! Put one push pin through two ends to make a 'pivot'/'hinge'.



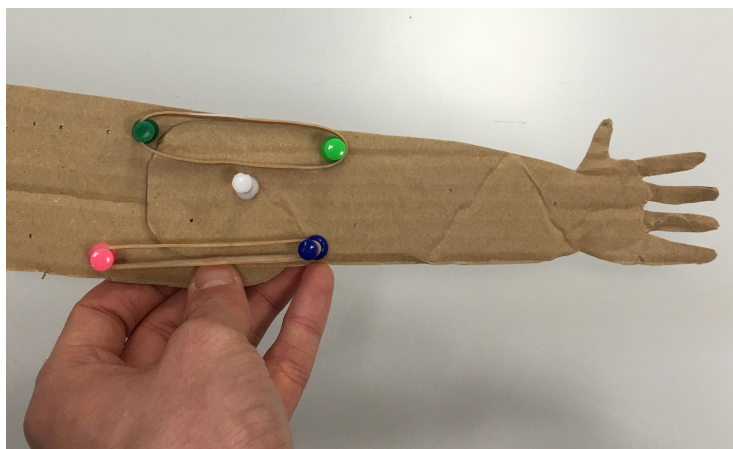
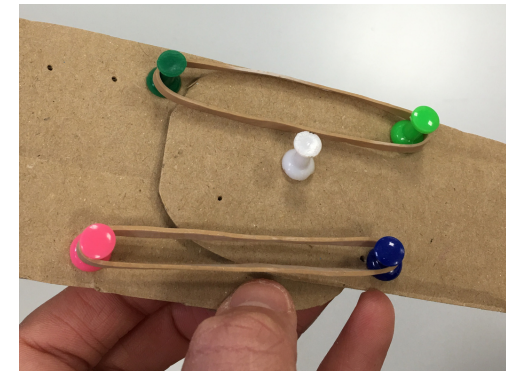
Step 3) Put blue tack on the other side for safety.



Step 4) Put in four more pins as shown below. Two should be on each part.



Step 6) Place rubber bands across the pins as shown below.



Your model is finished!

Now try to bend the arm at the 'elbow'.

**What do you see?
What happens to the length of the rubber bands?
How might this represent our muscles?**



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Investigation

Observations

When I lift the arm up, the top rubber band becomes _____ and the bottom rubber band becomes _____.

When I pull the arm down, the top rubber band becomes _____ and the bottom rubber band becomes _____.

What does the model show?

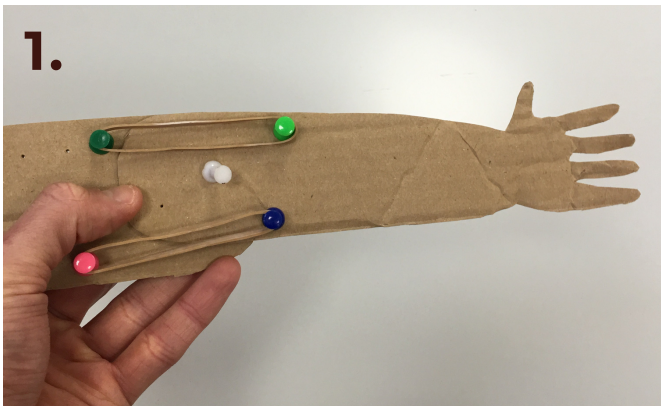
This is not a perfect recreation of our muscles.

In our body, **muscles work in pairs** to **pull our bones** in different directions so that we can move. Muscles are attached to bones by strong cords called **tendons**. These act like tape to hold the muscles in place. Muscles then change shape to pull bones.

In our model, I think that:

- The rubber bands represent our _____.
- The card represents our _____.
- What represents the tendons? _____

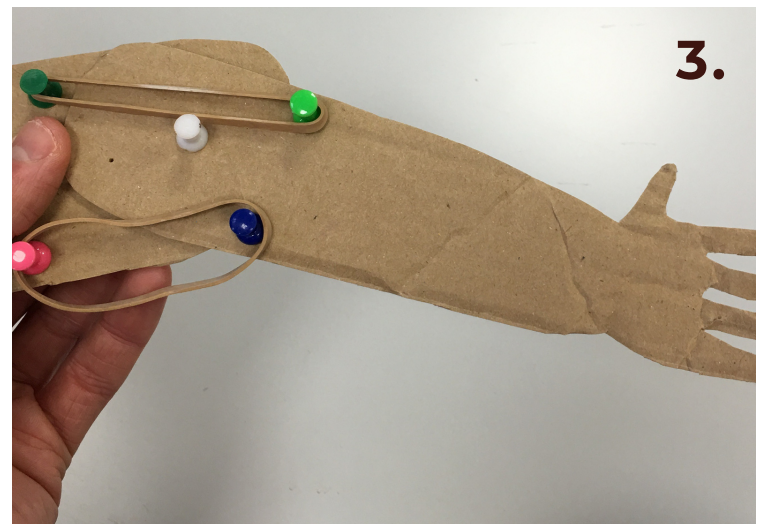
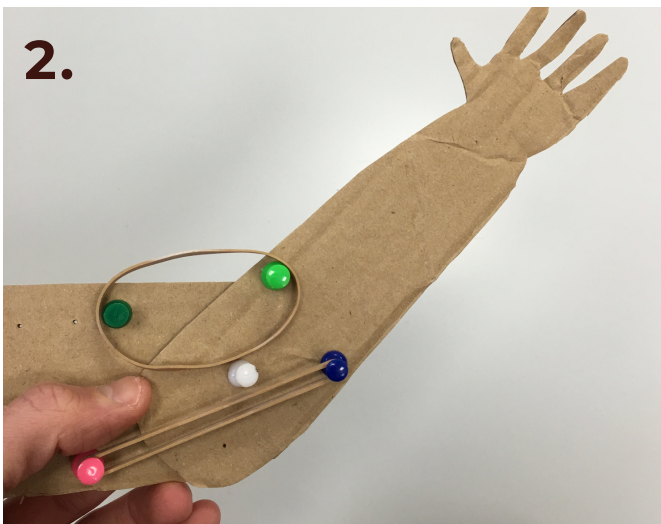
Extension: What we made today is only a **model**, something to help us see how our muscles work. Can you think of any ways that our model might **not** be similar to how real arms move?



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Answers



When I lift the arm up, the top rubber band becomes **shorter** and the bottom rubber band becomes **longer**.

When I pull the arm down, the top rubber band becomes **longer** and the bottom rubber band becomes **shorter**.

The rubber bands represent our **muscles**.

They show how muscles change shape as they work. In the first picture above, the rubber bands are a certain length. Then in the second picture, as the arm is raised, the top rubber band becomes shorter and bunches up. When muscles become shorter, it is called **contracting**. Becoming shorter pulls the bones upwards, raising the arm. The bottom rubber band becomes longer. When a muscle becomes longer again and returns to its normal size, we call this **relaxing**. Muscles work in pairs: one contracts while the other relaxes. In the third picture, the top band becomes longer, and the bottom becomes shorter. The bottom muscle **contracts** and the top is **relaxes**, so the arm lowers.

The card represents our **bones** and the **push pins** represent the tendons.

Muscles and rubber bands are not very similar, so our model is not perfect. For example, our arm can raise up as in the model, but it does not bend down in the same way. Our model does this to show the changes in shape of muscles more clearly. Rubber bands also get more tense as they are stretched, unlike muscles, which get more tense as they contract. Models are never perfect, but they are useful to show us how systems work.