



Curiosity Guide #603

Muscular Science

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

Muscular Electricity

Investigation #2

Description

Dare your friend to measure some muscles with electricity!

Materials

- Muscle Spikerbox from backyardbrains.com
- USB cable
- Computer
- Weight
- A friend

Procedure

- 1) Set up the Spikerbox according to kit directions.
- 2) Place the sticky, large-muscle electrodes on the inside bicep of your friend.
- 3) Connect the alligator clips to the box and the other ends to the electrode.
- 4) Attach the black ground wire to a ring, to another electrode on the body, or hold the ground wire.
- 5) Turn on the Spikerbox.
- 6) What do you hear?
- 7) Have your friend lift the weight. Compare the sounds you hear.

My Results

Explanation

Our muscles are controlled by our brain. Some muscles are voluntary, like our skeletal muscles, while others are involuntary, like the smooth muscles and cardiac muscles. The brain moves a muscle by sending an impulse along the nervous system to the muscle itself. With the Spikerbox, you can measure the electric potential difference in the muscle so you can see and hear the amount of motor activity in a muscle. Firing bicep muscles are large and can produce a lot of force, especially compared to smaller muscles in the face. Each muscle is made of many cells, or fibers, that can change shape. Stimulating the fibers electrically causes the actin and myosin chains to cross over each other, making a muscle contract. In a large muscle group, a motor neuron can activate thousands of muscle fibers. In smaller muscle groups, a motor neuron might only stimulate ten fibers to provide fine motor movement.

Gather more information: Our muscular system has three kinds of muscles: skeletal, smooth, and cardiac. Skeletal muscles are voluntary muscles that we can control to move parts of our bodies. Skeletal muscles keep very busy, and they can also get tired. Visceral or smooth muscles are much weaker, and we can't control them. Some of these are found in our digestive system, where the smooth muscles move food through our organs. The cardiac muscle makes up the walls to our hearts. We can't control the cardiac muscle, either, but your cardiac muscle can go a lifetime before getting tired! Muscle power!

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