Mind Control with Gianni DeCenzo

Objective: Students will be able to demonstrate the Kohnstamm phenomenon and observe whether or not they can control and stop involuntary actions using their minds.

IMPOSSIBLE SCIENCE

Hook

1. Tell students to stand up and do ten jumping jacks, then touch their ears, and turn around three times while whistling.
2. Ask: How did you make your feet and arms move when doing the jumping jacks? How did your hands know to move to your ears? How did your mouth start whistling? Share responses- likely a few students will guess something along the lines of, “My brain told it to.”
3. Explain to students that they are essentially correct; their brains send a command to their muscles causing the muscles to move.

Procedure

1. Explain: When you want to move a muscle, your brain sends a signal through your motor cortex, down through your spine into your muscle. Nerve cells called motor neurons connect to each muscle, and when one sends a signal to a muscle, it travels down a long extension of that cell, called an axon, to the muscle. Then, a chemical is released that causes the muscle to move. When the message from the motor neuron stops, the muscle relaxes.
2. Review vocabulary and give students time to copy it into their notebooks.

Vocabulary:

Voluntary Actions: Actions that are consciously within our control.
Involuntary Actions: Actions that we cannot control with our mind.
Reflex Action: a rapid and involuntary response to stimuli.
Motor Neurons: Nerve cells that connect to each muscle
Axon: a long thin extension of a nerve cell that connects to other cells.
Kohnstamm phenomenon: a sustained, involuntary contraction of muscle after a prolonged voluntary contraction.

3. Explain that the brain has more to do with the physical objects in your head, such as the 80 billion neurons that help you move, but the mind has more to do with conscious thought.
4. Ask: When you move your hand away from something hot, which is it, the brain or the mind? What about when you sneeze? Is it voluntary or an involuntary reflex? How can you tell?
5. Tell students that these are involuntary movements called reflex actions. Explain that sometimes, when you contract a muscle for a long period of time, it continues to stay contracted- this is called the Kohnstamm phenomenon, first described by German neurologist, Oskar Kohnstamm, in 1915.
6. Show students Impossible Science video.
7. Invite half of students to try the floating arms experiment in a doorway, and have the other half try it with one arm against the wall, then switch. Each should press the back of their wrist against the doorway/wall as hard as possible for sixty seconds before stepping away.
8. Have students record what happened with one arm vs. both.

9. Ask: If you sent a message from your brain to your arms to try to keep them down, would it override the Kohnstamm phenomenon? Which is more powerful, your mind or your brain?
10. Record predictions, then have students try again, but this time, they should try to keep their arms from floating up.
11. Record what happened.
12. Try different amounts of time, and different positions such as the front of the hand, the feet pressing, instead of hands, and record observations.

Assessment:

Students will record an explanation of how muscles move correctly incorporating all of the above vocabulary. Students will observe that they are able to block their arms from floating up when they put their minds to it. They should include an explanation of what this shows about the power of the mind over involuntary muscle movements.

Extension:

Students can recreate some of the other mind control tricks shown in the video, and they can try to find another example of the Kohnstamm phenomenon to share with the class.

Safety Notes:

Adult Supervision Recommended

Watch the companion video here:

YouTube