

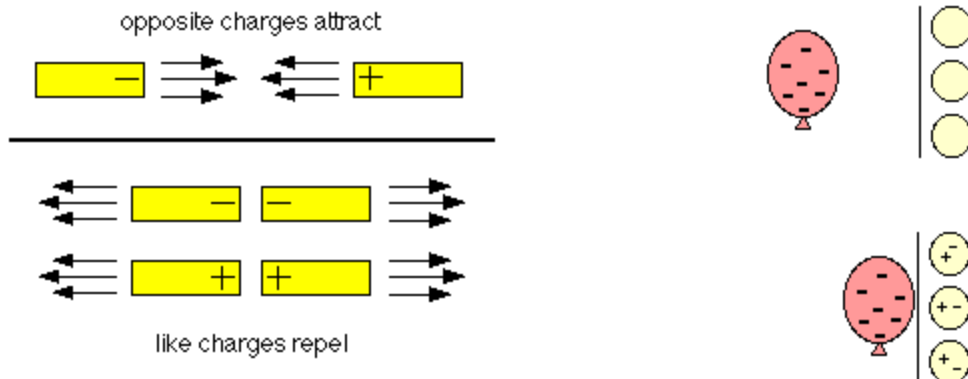
Static Electricity

PURPOSE:

1. To understand the properties of static electricity
2. To brainstorm applications of how static electricity can be used

TALKING POINTS:

- Have you ever heard of static electricity?
- Static electricity is present when atoms receive a charge. This can come from actions like rubbing your socks on the carpet, or a balloon to your hair. There are negative and positive charges, these are called electrons and protons. Like charges will repel and opposite charges will attract. If your hair has ever gone up into the air after being rubbed by a balloon this is due to the hair being attracted to the balloon by means of static electricity.
- Have you ever gotten shocked when you touch a doorknob or something metal?
- This is static electricity! We get shocked when we touch something after charging our bodies. Our bodies want to be in a neutral state, meaning there are an equal number of electrons and protons. To do this, the charges jump from our bodies to whatever we just touched. This happens with things that conduct electricity well, such as metals.



MATERIALS:

Part 1:

- 1 pen with thread wrapped around, and paper clip dangling from thread (see picture)
- 2 tin cans
- 1 balloon
- 1 plastic bin

Part 2:

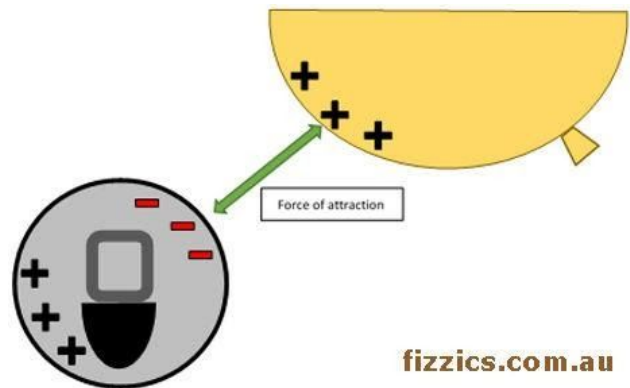
- 1 empty soda can
- 1 balloon

PART 1 PROCEDURE:

1. Balance the pencil/paper clip contraption across the top of two tin cans so that the paper clip hangs between the two cans. Make sure there is no excess thread touching either can.
2. Place the tin cans on top of the plastic bin
3. Blow up a balloon and rub the inflated balloon on your own or someone's hair.
4. Slowly draw the balloon closer to the side of one of the cans until the paper clip reacts to the change in charge and begins to swing back and forth. The paper clip should hit the side of each tin can, making it look and sound like a bell tower!
 - a. Touching the balloon to the tin can, neutralizes the charges and the bell tower will not work!

Explanation:

By rubbing the balloon, the balloon picks up a negative charge due to the newly acquired electrons. When the balloon is brought close to the can, the can acquires a dipole with the positive charges attracted to the side of the can that's closest to the balloon, and the negative charges on the opposite side farthest away from the balloon (this makes sense because opposite charges attract, like charges repel). The paper clip tries to adjust to the newly charged environment, and that is what makes the clip swing back and forth. Drawing a picture will help.



By rubbing the balloon, the balloon picks up negative charges from the hair. When the balloon is brought close to the paperclip, the paper clip is affected by these negative charges and so begins to swing back and forth.

PART 2 PROCEDURE:

1. Blow up a balloon.
2. Charge the balloon using someone's hair or a nearby carpet, and bring the charged balloon close to the soda can (the soda can should be attracted to the balloon).
3. Try performing the following experiments:
 - a. Does more rubbing make the soda can more attracted to the balloon?
 - b. Try to build up enough charge to actually pick the soda can up off the ground
 - c. Does short or long hair charge the balloon more?

WRAPPING UP:

Closing Questions:

1. What is static electricity?
 - a. An imbalance of electric charges within or on the surface of a material.
2. What happens when you rub a balloon on your hair?
 - a. electrons are collected on the balloon and the balloon gets a negative charge
3. How can you make the balloon have a stronger charge?
 - a. rub longer, rub a material that transfer electrons better