



STATIC ELECTRICITY EXPERIMENTS

MATERIALS:

PVC Pipe
Aluminum Can
Tinsel
Tissue Paper
Paper Towels
Balloon
Plastic Bag

VOCABULARY:

Static Electricity	Negative	Positive	Current
Charge	Matter	Protons	Conductive
Electrons	Atoms	Nucleus	Repel
Attract	Grounded	Discharge	Volts

DIRECTIONS:

1. Lay the aluminum can on the table.
2. Rub the PVC Pipe vigorously with the paper towel to build up a charge.
3. Hold the PVC Pipe near the can. It should make the can move without touching it.
4. Try rubbing the balloon on your head.
5. Hold the balloon near the can. You should be able to move it again without touching it.
6. Try making a piece of tinsel, tissue paper or a plastic bag levitate above the static charged PVC Pipe.

THE STEAM BEHIND THE EXPERIMENT:

When we talk about static electricity, we generally mean an imbalance between negative and positive charges in objects. Electric charge is a fundamental property of matter. Nearly all electric charge in the universe is carried by protons and electrons. Protons are said to have a charge of +1 electron unit, while electrons have a charge of -1, although these signs are completely arbitrary. Because protons are generally confined to the nucleus, which are embedded inside atoms, they are not nearly as free to move as electrons. Therefore, when we talk about electric current, we nearly always mean the flow of electrons.

When two objects are rubbed together to create static electricity, one object gives up electrons and becomes more positively charged while the other material collects electrons and becomes more negatively charged. This is because one material has weakly bound electrons, and the other has room to pick up more electrons, so the electrons can move from one to the other, creating a charge imbalance after the materials are separated. Materials that can lose or gain electrons in this way are called triboelectric. One common example of this would be shuffling your feet across carpet, particularly in low humidity which makes the air less conductive and increases the effect.

Because like charges repel each other, they tend to migrate to the extremities of the charged object in order to get away from each other. This is what causes your hair to stand on end when your body takes on a static charge. When you then touch a grounded piece of metal such as a screw on a light switch plate, this provides a path to ground for the charge that has built up in your body. This sudden discharge creates a visible and audible spark through the air between your finger and the screw. This is due to the high potential difference between your body and the ground which can be as much as 25,000 volts!

MAKE IT AWESOME:

Try moving different sizes of cans with the PVC Pipe or balloon.



EXTENSIONS:

1. What happens when you change the size of the PVC pipe?
2. Can you make a plastic bag levitate over the pipe?
3. What other changes can you come up with for this experiment?

WEBSITES AND VIDEOS:

1. Video: Use the Force: <https://youtu.be/B-Iiw1vCk>
2. Static Electricity Experiment: <https://ctsciencecenter.org/blog/science-at-play-static-electricity/>
3. 9 Tricks with Static Electricity: <https://youtu.be/ViZNgU-Yt-Y>

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