

"Static Electricity in Different Materials"

Question:

Does rubbing a balloon against different materials produce different amounts of static electricity?

Hypothesis: Rubbing a balloon against different materials makes different amounts of static electricity.

List of materials:

Balloon
Tissue Paper
Grounded Copper Plate
Glass Custard Cup
Fabrics and Other Materials

Design of the Experiment:

I read in a book that everything has an electric charge. We cannot see them, but they can rub off of some things and on to others making static electricity. Static means not moving. Electricity is a kind of energy most often carried by wires used to produce light and heat and to run motors. Static electricity is electricity that is not moving.

My hypothesis states that yes, there will be a different amount of static electricity when I rub a balloon and different materials together.

I decided to use one balloon for all of the tests because if I used two or more balloons, they might not be the same size and might make different amounts of static electricity and cause an error.

I used tissue paper because tissue paper is light enough to get picked up by any static electricity on the balloon.

I used a hole punch to make equal pieces of tissue paper. If I used different sized pieces of tissue paper, I would not get an honest count. If I

did not get an honest count, I would not know how much static electricity there was for each test.

For each test, I rubbed the balloon 10 times on 6 inches of material in one direction. I wanted to get the same amount of rubbing every test. A different number of rubs might change the answer. A different length of rub might also change the answer. If I rubbed the balloon back and forth, the electrons might get picked up and dropped.

I used a glass custard cup because it was not metal and it kept the balloon at the same distance from the tissue paper dots for each test.

I used a grounded copper plate to equalize the charge on the balloon and tissue paper dots. As a result, the balloon did not pick up any more dots until rubbed again. The copper plate was connected to the house ground. The house ground is connected to the earth. It is like the lightning rod.

Experiment

1. Take a hole punch and punch out a lot of tissue dots.
Put the tissue paper dots on the grounded copper plate to equalize the static electricity of the tissue paper dots.
2. Move the tissue paper dots around on the copper plate so all of the tissue paper dots can lose any static electricity on them.
3. Put the tissue paper dots in a glass custard cup.
4. Roll the balloon around on the grounded copper plate so that it can lose any static electricity.
Set the balloon over the glass custard cup to make sure there is not any static electricity. If any tissue paper dots move, ground the balloon and tissue paper dots again. Repeat the test.
5. Rub the balloon 6 inches in one direction on a piece of fabric or other material 10 times.
6. Put the balloon over the glass custard cup.
7. Take the dots off the balloon and count them.
8. Record the data.
9. Discharge the balloon and dots on the grounded copper plate.
10. Repeat the experiment for a different material.
- 11.

Summary of results

showing type of material and number of dots attracted.

My Hair	73
100% Wool Cloth	45
My Dog (short hair Walker Hound)	39
50% Polyester 50% Cotton Fabric	33
50% Polyester 50% Rayon Fabric	32
DC Fleece Jacket - 100%	27
100% Polyester Fabric	24
Dining Room Carpet (unknown)	20
100% Vinyl Fabric	18
100% Cotton Fabric	18
100% Acetate Fabric	18
55% Polyester 45% Wool Fabric	16
Dining Room Wall (painted drywall)	7
Television Screen (television off)	3
100% Rayon Fabric	3
100% Nylon Fabric	2
Ceramic Tile Floor in Entryway	1
Television Screen (television on)	0
Mixed Grass (backyard)	0
Dryer Sheet	0
Dining Room Window	0

Conclusions:

1. The hypothesis is correct.
2. Grass, a dryer sheet, a glass window and a turned on television screen had the least amount of static electricity.
3. My hair, wool, and dog hair produced the most static charge.
4. Three materials; acetate, vinyl, and cotton fabric had the same score.