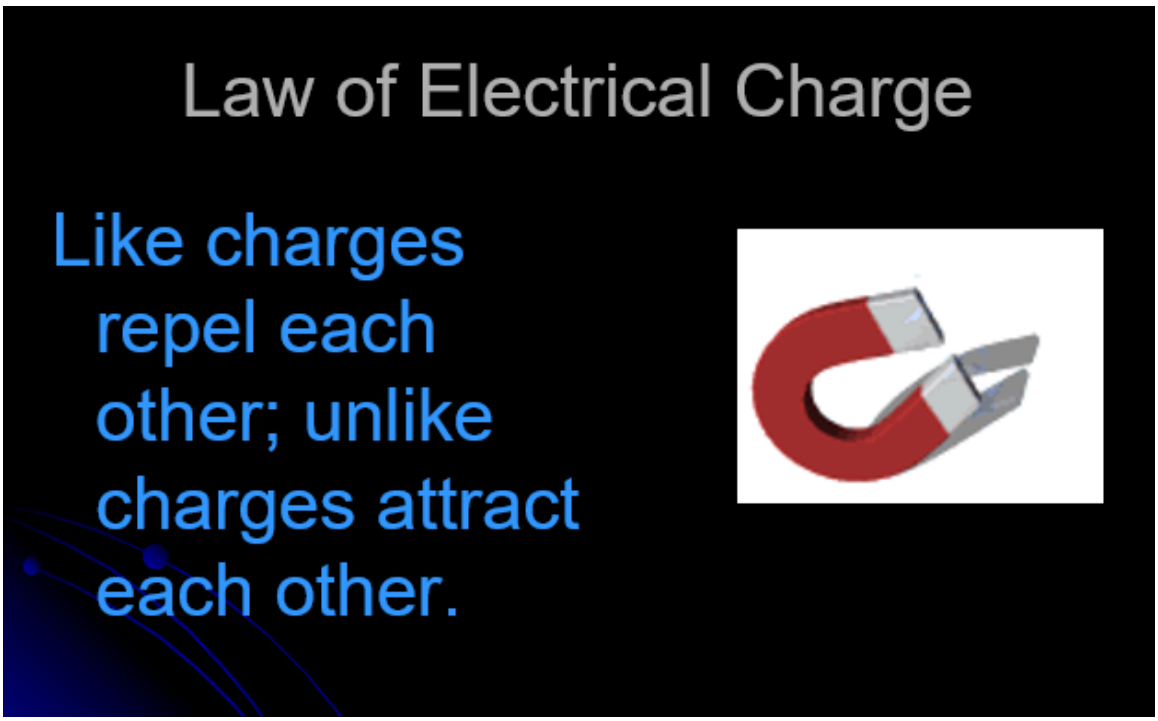
CE9.1

Demonstrate and analyze characteristics of static electric charge and current electricity, including historical and cultural understanding.

Indicators for this outcome

(b) Gather evidence for the transfer of static electric charges, including charging by friction, charging by conduction, charging by induction, and electrostatic discharge and create written, visual, and/or dramatic representations of those processes.

(f) Explain, with reference to electron transfer, the production of static electrical charges in some common materials such as flannel, fur, wood, plastic, rubber, and metal.

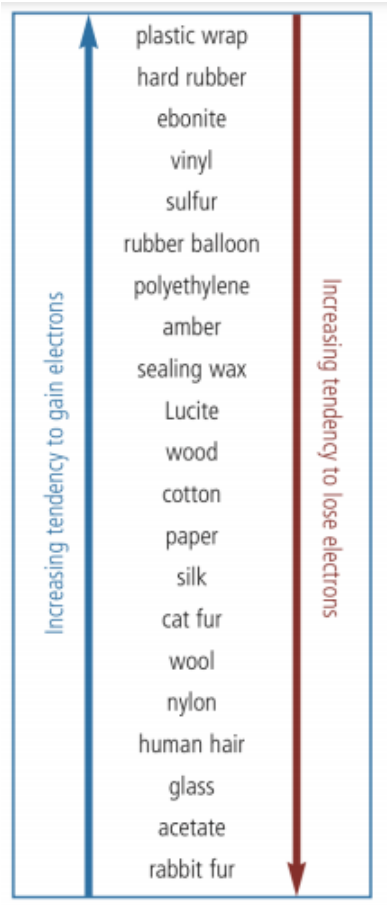


Purpose

The purpose of this lab is to understand the generation of static charges. Through the activities below, you will learn how charges are formed as a result of the separation and transfer of charges by friction. The forces of attraction and repulsion will also be demonstrated.

Materials

- 1 piece of tape
- 1 piece of string
- 1 glass rod
- 1 acetate rod
- 1 vinyl rod
- 1 piece of fur
- 1 piece of silk
- 1 piece of flannel / wool
- 1 balloon



Procedure

1. Students will gather data in partners for this lab but will hand in individual labs.
2. Partner groups will gather the necessary equipment from the front table.
3. Read the **Data tables** on the following pages. Before each step, predict the result and record this prediction on the table. **This is your hypothesis.**

4. Blow up your balloon. Tie the end of your piece of string to the balloon. Using your piece of tape, suspend your balloon from shelves surrounding the room, hanging above the counter below. The balloons should not be touching the counter.
5. Rub your balloon with the piece of fur. The balloon is the **acceptor**; the fur is the **donor** of electrons. This will be your control object.
6. Rub one of the rods with one of the pieces of material (ex. Rub the glass with the silk). Then bring the rod close to the balloon. **Do not make contact**. Record your observations.
7. Repeat step 5 until you have rubbed each of the three pieces of cloth on each of the three different rods.
8. Once you have completed the above steps, join with another group to form a group of four. Suspend both of your balloons at the same height and far enough apart that they are not touching.
9. Rub both balloons with the fur.
10. Bring the two balloons together. As above, record a hypothesis first and then your observations.
11. Repeat using the other two pieces of material.

Discussion

1. List the objects that had a weak hold on their electrons.

2. List the objects that had a strong hold on their electrons.

3. You charged the balloon by rubbing it with fur, and it gained a negative charge. Does that mean that it gained or lost electrons?

4. One of the laws of electrical charges is that similar charges repel. If a second charged object repels a charged balloon, what charge would this second object have? Explain why.

5. Another law of electric charges is that opposite charges attract. If a charged object attracts the charged balloon, what charge would this object have? Explain.

Conclusion

Summarize the lab in a conclusion statement.

Data

Rod	Material	Hypothesis (attraction / repulsion / nothing)	Actual Result (attraction / repulsion / nothing)
Glass	Silk		
Glass	Fur		
Glass	Flannel / Wool		
Acetate	Silk		
Acetate	Fur		

Acetate	Flannel / Wool		
Vinyl	Silk		
Vinyl	Fur		
Vinyl	Flannel / Wool		

	Material	Hypothesis (attraction / repulsion / nothing)	Actual Result (attraction / repulsion / nothing)
Balloon	Silk		
Balloon	Fur		
Balloon	Flannel / Wool		