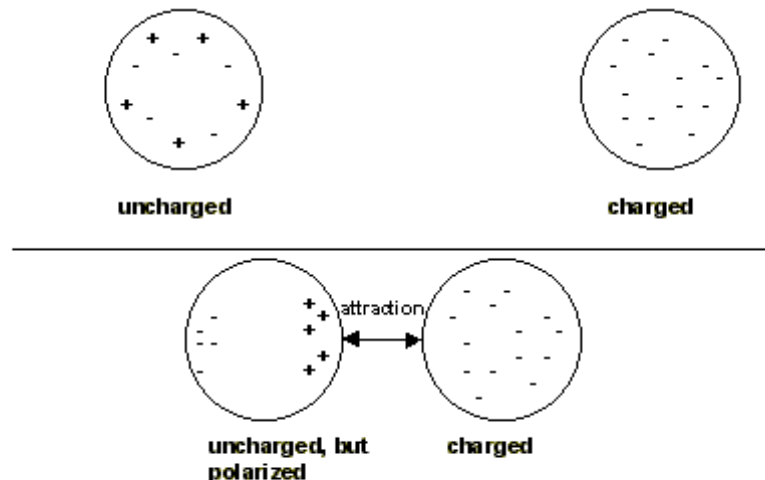


Static Electricity

Strand	Force, Motion, and Energy
Topic	Investigating static electricity
Primary SOL	4.3 The student will investigate and understand the characteristics of electricity. Key concepts include c) static electricity.
Related SOL	4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources; i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs; k) data are communicated with simple graphs, pictures, written statements, and numbers.

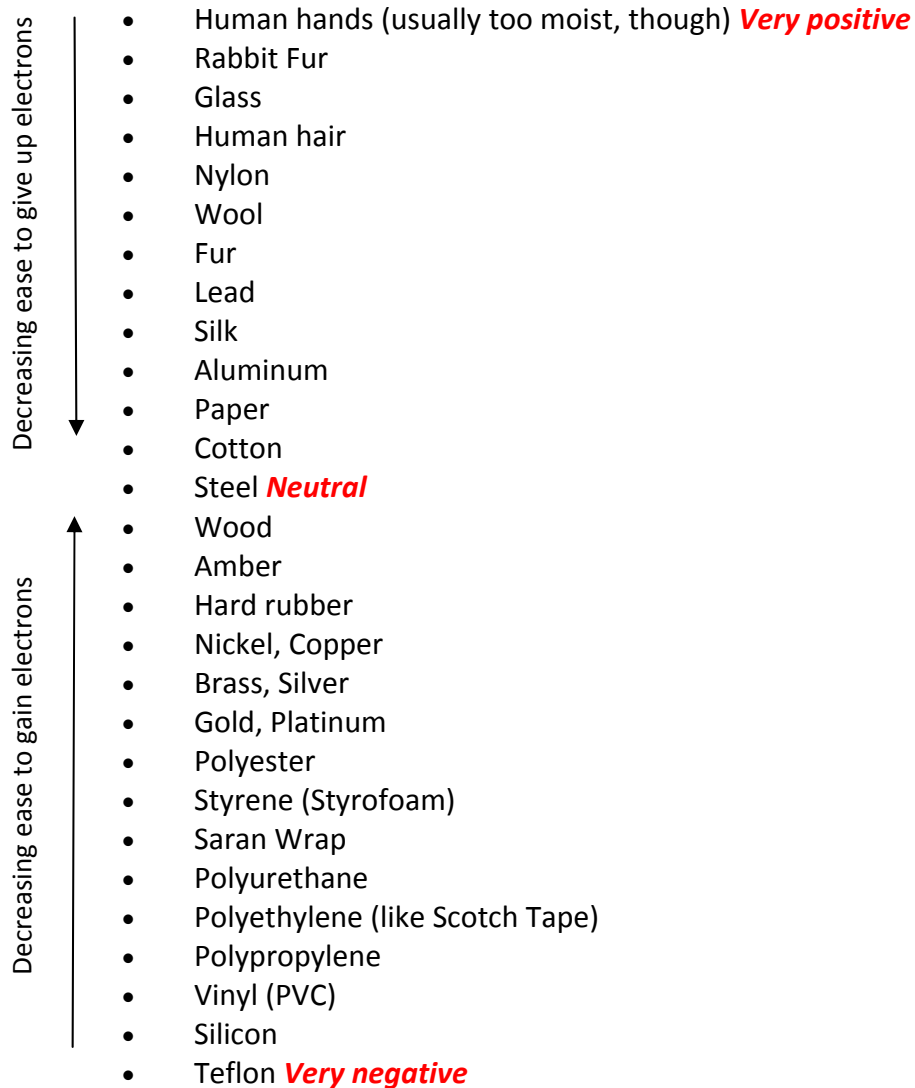
Background Information

Static electricity exists whenever there are unequal amounts of positively and negatively charged particles present. Rubbing a balloon or comb on your hair makes the balloon or comb have more of one type of charge. The rubbing transfers electrons between your hair or you and the surface of the comb or balloon. As you bring the balloon near an object, the balloon can induce a positive charge on the object because opposite charges attract. When the object and the balloon touch, electrons flow from the balloon to the object, giving the object a negative charge. Now that the balloon and the object both have the same charge, they repel each other.



Static electricity is not caused by friction. It appears when two unlike materials make contact and then are separated. All that is required is the actual touching of the two materials. Rubbing

will increase the total contact area between the materials and this will, in turn, make the materials more electrically dissimilar. Rubbing enhances static electricity, but it is not the cause. Some objects readily give up electrons and others readily gain electrons. The items at the top of this list readily give up electrons



Materials

- Copies of the attached Static Electricity Lab Experiments worksheet

For each small group, a box that includes:

- Transparent tape
- Comb
- Balloon
- Access to water from a faucet
- Science journal or loose leaf paper

Vocabulary

static electricity, repel, attract, negative charge, positive charge, electrons

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Ask students what happens when they touch a door knob and it gives them a shock. Hold a discussion about what students know about static electricity.
2. Tell students that they will be performing their own static electricity experiments today.

Procedure

1. Place students into groups of three to four students.
2. Give each group the box of materials and each student the attached Static Electricity Lab Experiments! sheet.
3. Have students review the packet.
4. Answer any questions that may arise.
5. Allow the students to complete the experiments.
6. Circulate and observe the experiment process to assist where needed.

Conclusion

1. Have students share their experiment designs in front of the class.
2. Discuss all student results from their experiments, pointing out any differences and why they might have occurred.

Assessment

- **Questions**
 - What is static electricity?
 - If I rub two balloons with a wool cloth and hang them on a string so that they are an inch from each other, what will happen? Explain.
- **Journal/writing prompts**
 - Someone in your family is leaving the house early in the morning. You notice they have a brown sock stuck to their back as they exit the door. Angrily, they stomp back in the house demanding, “Who put this sock on my back?” Explain scientifically how the sock was stuck on their back without someone putting it there on purpose.
 - Lightning is a very powerful form of static electricity. Explain what you think might be going on in order to generate the amount of electricity to make a bolt of lightning.
- **Other**
 - Have students explain how static electricity exists.
 - Have students list three personal experiences with static electricity.

Extensions and Connections (for all students)

- Place some plastic drinking straws on a table. Charge a plastic pen with static electricity by rubbing it with a wool cloth. Place the pen close to the straws. Ask students to describe what happens and why.

- Have students try a variety of hairbrushes and combs made out of different materials like plastic, wood, or metal. Does your hair behave differently with each? Which one would give you a “bad hair day”?

Strategies for Differentiation

- Allow students to use an audio recorder or a video recorder.
- Have students write a children’s book talking about static electricity.

Static Electricity Lab Experiments

Names: _____ Date: _____

Try some of the following experiments.

Experiment 1

1. Tear a piece of paper into tiny pieces. Stroke a comb through your hair several times. Place the comb near the paper pieces.

What happens?

Why?

Experiment 2

1. Blow up a balloon, and rub the balloon on your head. Place the balloon near the paper pieces and observe what happens. Repeat and substitute salt or puffed rice for the paper.

Why are the paper and other objects attracted to the balloon?

Do the objects stay attracted to the balloon?

Why or why not?

2. Rub the balloon on your head and try sticking the balloon to the wall. Why does it stick?

How long does the balloon stay up on the wall?

Why does the balloon eventually fall?

What would make the balloon stay up longer?

3. Rub the balloon on your head and hold the balloon near a small stream of water coming from a faucet.

What happens?

Why?