

10.1 - EXPLORING STATIC CHARGE

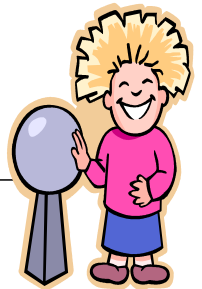
DEMONSTRATION

- 1a. Place the ebonite rod in the paper punch dots... what happens? _____
_____.
- b. Charge the ebonite rod, by rubbing it with a piece of fur. Now what happens when step A is repeated?
_____.
- 2a. Blow up the balloon. Charge it, and bring the charged spot near the paper dots. What happens?
_____.
- b. Try a spot that you didn't charge. What happens now? _____.
- c. Stick the balloon to the wall, using the charged side. Allow some time to pass (check back at the end of class)...What happens to the balloon? _____.

STATIC ELECTRICITY

3. Define the following:
- **electricity**: a form of energy that results from the interaction of charged particles, such as _____ and _____.
 - **static**: _____, or not moving.

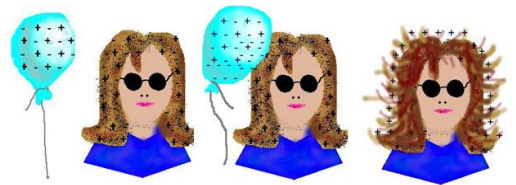
4. What does **static charge** or **static electricity** mean _____
_____.



CHARGING BY FRICTION

5. According to the Bohr-Rutherford model of the atom,
- a. Which particles are difficult to add or remove from an atom? _____
Why? _____
- b. Which particles are easy to add or remove from an atom? _____
Why? _____

6. What happens when an object becomes charged by **friction**?



7. Describe what type of charge (positive, negative, or neutral) an object has if:


- a. It has an equal number of protons and electrons _____
- b. It has more electrons than protons _____
- c. It has less electrons than protons _____

AN ELECTROSTATIC SERIES

An electrostatic series is a list of materials that have been arranged in order of their ability to hold on to electrons.

8. Describe an experiment you could perform to arrange a list in this type of order:

Copy Table 10.1 from your book

Material	Strength of Hold on Electrons
	<p style="text-align: center;">Weak</p>  <p style="text-align: center;">Strong</p>

9. When you comb your hair with plastic comb, **which object**, the hair or the comb, holds on to its electrons more tightly? _____ What is the charge on this object? _____

10. If leather is rubbed with polyester, the polyester becomes negatively charged. Would you place leather above or below polyester in an electrostatic series? _____

11. In the winter, removing a wool hat can give you hair a static charge. Use the series to predict the charge on your hair. _____

INSULATORS AND CONDUCTORS

12. Define the following:

Term	Definition	Example (general and specific)
Conductor	A material in which electrons _____ move easily from one atom to another.	
Insulator	A material in which electrons _____ move easily from one atom to another.	
Semi-conductor	A material in which electrons can move _____ between atoms.	

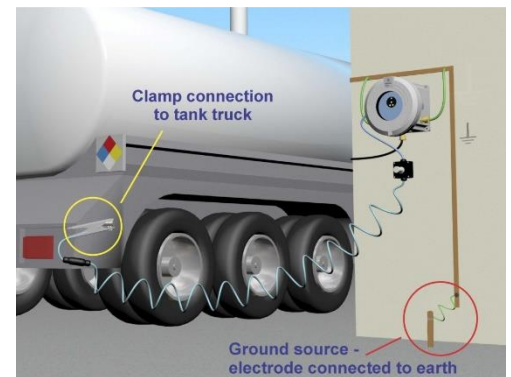
13a. Is dry air a conductor or an insulator? _____

b. Is humid air a conductor or an insulator? _____

ELECTRICAL GROUNDING

Define the following:

- **ground:** an object that can supply a very _____
number of _____ to, or can remove a
very large number of _____ from a
charged object. By supplying or removing electrons, it makes
the charged object _____.



14. Why is grounding electrical equipment very important?

15. Draw the **symbol** for ground:

ELECTRIC DISCHARGE

When two objects with very large amounts of opposite static charge are brought close together, the electrons from the negative object can actually "jump" through the air towards the positive object. This is called electric discharge.

16a. If a room is dark enough, electric discharge is actually visible. What does it look like? _____

b. What kind of sound is produced when electric discharge occurs? _____

c. Describe two common situations where you have encountered electric discharge:

- _____

- _____

CHARGING BY FRICTION – WORKSHEET

1. Complete the statements.

- a. In a _____ object, the number of positive and negative charges are _____.
- b. _____ (a rubbing action) transfers electric charges from one object to another. This results in _____ amounts and an uneven distribution of _____.
- c. The substance with a _____ hold on its electrons will pull electrons away from the substance with a _____ hold on its electrons.

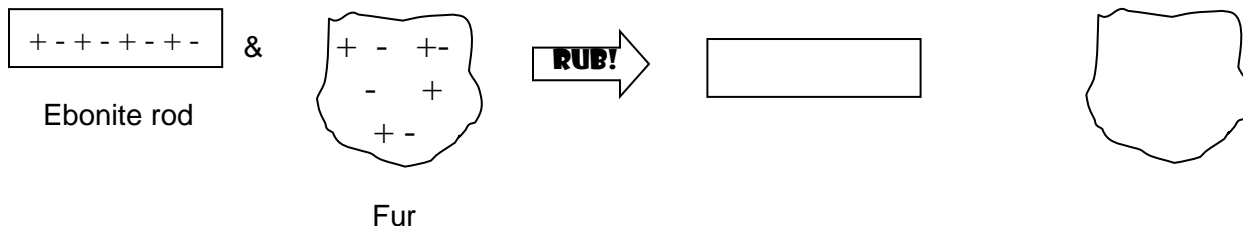
2. Use the electrostatic series on p. 405 to answer these questions:

- a. If a rubber balloon was rubbed against hair, the _____ will more likely lose its electrons because the _____ holds onto its electrons more strongly. Therefore, the balloon will have a _____ charge and the hair will have a _____ charge.
- b. Which will likely produce a greater amount of static charge: a wool sweater worn under a cotton jacket, or a wool sweater worn under a rubber rain coat? Why?

3. Use the electrostatic series on p. 405 to determine what kind of charges (positive or negative) occur when the following things are rubbed together:

Material	Positive	Negative
Lucite and wool		
Ebonite and plastic		
Ebonite and fur		
Glass and silk		

4. Show how the electrons will move when the two items below are rubbed together.



Homework

p. 410 #2, 4, 6, 7, 8