THE ELECTROSTATIC SERIES – Charging by Friction (Predicting a Charge)

This can be used to predict what charged will be gained by two objects when they are rubb together. This is called charging by _____.

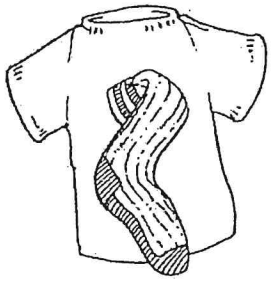
_____	acetate	+
hold on	glass	
electrons	wool	
	fur or hair	
	silk	
	aluminum	
	cotton	
	paraffin wax	
	ebonite	
_____	plastic	
hold on	rubber	
electrons	gold	-

When two objects are rubbed together:

- the one closer to the top of the series will _____ electrons and become _____
- the one closer to the bottom will _____ electrons and become _____

Example:

Suppose wool socks are dried with a cotton T-shirt.



- _____ is closer to the top of the electrostatic series
- so it has a _____ hold on its electrons
- will _____ electrons, gaining a _____charge.

- _____ is closer to the bottom of the list
- so it has a _____ hold on electrons, attracting those from the wool
- The cotton T-shirt will _____electrons and become _____charged.

The positive wool socks and the negative cotton T-shirt have opposite charges and so they are attracted to each other.

Practice: Use the electrostatic series to predict the charge on the following materials.

1. **Ebonite** is rubbed with **fur**

_____ gains electrons and becomes _____ charged

_____ loses electrons and becomes _____ charged

2. **Acetate** is rubbed with **wool**

_____ gains electrons and becomes _____ charged

_____ loses electrons and becomes _____ charged

Name:_____ Date:_____

Electrostatic Series Practice Worksheet

1. Draw charges on each of the following objects so they are neutral. Complete the blanks below about what would happen when these materials are rubbed together.

Object 1: Glass Beaker

Object 2: Cotton cloth

Material with stronger hold on electrons: _____

show which direction the electrons will move using arrows from one object to the other

Final Charge on Object 1: _____ Final Charge on Object 2: _____

2. Draw charges on each of the following objects so they are neutral. Complete the blanks below about what would happen when these materials are rubbed together.

Object 1: Aluminum Rod

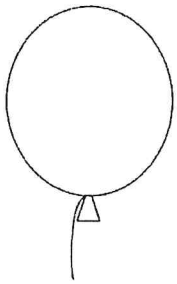
Object 2: Wool sock

Material with stronger hold on electrons: _____

show which direction the electrons will move using arrows from one object to the other

Final Charge on Object 1: _____ Final Charge on Object 2: _____

3. Draw charges on the T-shirt and on the balloon so that they are both neutral. Complete the blanks below about what would happen when these materials are rubbed together.



Object 1: T-shirt (cotton) **Object 2: Rubber Balloon**

Material with stronger hold on electrons: _____

**show which direction the electrons will move using arrows from one object to the other

Final Charge on Object 1: _____ Final Charge on Object 2: _____

4. Complete the blanks for the following two materials being rubbed together.

Object 1: Cotton **Object 2: Silk**

Material with stronger hold on electrons: _____

Final Charge on Object 1: _____ Final Charge on Object 2: _____

5. Complete the blanks for the following two materials being rubbed together.

Object 1: Human Hair **Object 2: Wool Hat**

Material with stronger hold on electrons: _____

Final Charge on Object 1: _____ Final Charge on Object 2: _____

6. Complete the blanks for the following two materials being rubbed together.

Object 1: Ebonite Rod **Object 2: Wax**

Material with stronger hold on electrons: _____

Final Charge on Object 1: _____ Final Charge on Object 2: _____

7. Complete the blanks for the following two materials being rubbed together.

Object 1: Gold **Object 2: Glass**

Material with stronger hold on electrons: _____

Final Charge on Object 1: _____ Final Charge on Object 2: _____