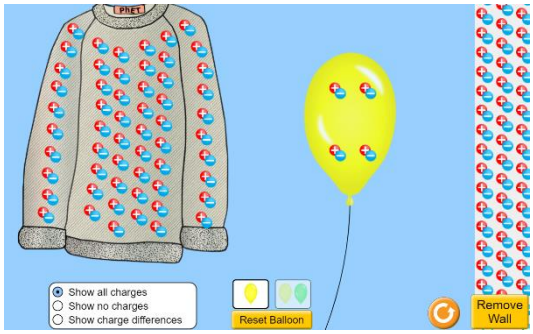
Name: _____ Period: _____ Date: _____

Balloons and Static Electricity PhET

https://phet.colorado.edu/sims/html/balloons-and-static-electricity/latest/balloons-and-static-electricity_en.html



The PhET balloon lab is a very simple lab that allows you to view how charges are attained and interactions between charges.

Since this is a model, it over simplifies what actually occurs to study charge transfer and interaction.

- The positive charges come from the protons held in the nucleus of atoms.
- The negative charges relate to the electrons outside of the nucleus, some of which can be separated from the nucleus of an atom.

Some electrons will be free to move and transfer between objects when surfaces are rubbed together (Charging By Friction). During charging by friction the material with the greatest affinity, or attraction to its electrons, will gain additional electrons and take on a negative charge. When this occurs, the material that lost the electrons takes on an equal but positive charge. Charge was not created nor destroyed, just transferred from one object to another.

Another interaction you will see in this model is induction. During induction a charged object will either attract or repel electrons away from it inducing the opposite charge on the surface of a second object.

During this simulation the rubber balloon/s and wool sweater can be charged by friction. The balloon can then interact with the sweater or the wall.

Charging by Friction

Lets try a few things and answer the same questions here on eClass, you can fill this page in to use as a reference as you follow the directions

1. Rub the balloon against the sweater. When you do this the balloon and sweater get charged by _____

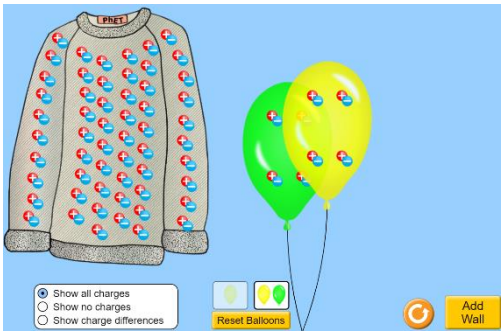
2. The sweater becomes _____ charged

3. The balloon becomes _____ charged

4. Does the sweater of balloon have a greater affinity for electrons?

5. Take the charged balloon away from the sweater and release it. What happens and why?

Reset the animation
Now add a second balloon and get rid of the wall as seen here.



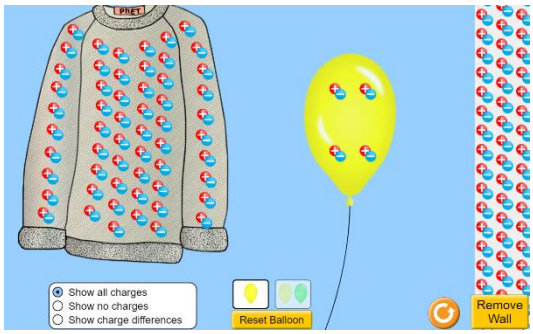
Rub each balloon on the sweater making each gain some of the electrons and both have a negative overall charge.

Take one negative balloon away from the sweater, and bring the other negative balloon close to it.

6. What kind of interaction do the balloons have to each other and why?

Lastly lets study <u>induction</u>

Reset the animation so you have only one balloon, sweater, and wall.
Charge up the one balloon on the sweater gaining electrons and a negative charge.



7. What happens to the electrons in the wall when you bring the negative balloon close to the wall but not touching it yet?

8. Keep the balloon close to the wall and release it. What happens and why?