**SC10F Methods of Charging and Grounding Activity Name:\_\_\_\_\_\_**

There are 3 ways to create a charge on an object. Use your notes to summarize them below:

1. Friction

2. Contact (Conduction)

3. Induction

**Go to the following website:** [**https://phet.colorado.edu/en/simulation/balloons**](https://phet.colorado.edu/en/simulation/balloons) **then click “run now”. Follow the directions below and answer the questions as you go…**

**Part 1: What we actually see…**

***Before starting, check “Show No Charges” at the bottom of the simulation…***

1. Place the balloon **NEAR** the sweater and let go.

**Did anything happen? If so, what?**

**Why do you think this happened? If nothing happened, why do you think this is so?**

2. Place the balloon **NEAR** the wall and let go.

**Did anything happen? If so, what?**

**Why do you think this happened? If nothing happened, why do you think this is so?**

2. Rub the balloon against the sweater then pull the balloon slightly away from the sweater

and let go.

**What happens?**

**Why do you think this happens?**

4. Place the balloon NEAR the wall and let it go.

**What happens?**

**Why do you think this happens?**

5. Place the balloon about half way between the wall and the sweater and let it go.

**What object (wall or sweater) is it more attracted to?**

**Why do you think it would be more attracted to this object and not the other one?**

***CLICK “RESET” IN THE BOTTOM LEFT CORNER.***

**Part 2: What is actually happening…**

***Before starting, check “Show all Charges” at the bottom of the simulation…***

1. Look at the charges shown on the wall, balloon and the sweater.

**Do you think any of these have a charge? Why/why not?**

2. Place the balloon **NEAR** the sweater and let go.

**Did anything happen? If so, what?**

**Why do you think this happened? If nothing happened, why do you think this is so?**

3. Place the balloon **NEAR** the wall and let go.

**Did anything happen? If so, what?**

**Why do you think this happened? If nothing happened, why do you think this is so?**

4. Rub the balloon against the sweater.

**Describe what happens in terms charges?**

**Which charges moved? Which ones stayed?**

**Think back to Chemistry, what part of the atom does each of these charges represent?**

**What charge does the balloon have? What charge does the sweater have?**

**Which of the 3 methods of charging does this represent?**

5. Pull the balloon slightly away from the sweater then let go.

**What happens?**

**Why do you think this happens? Explain in terms of the charges.**

6. Place the balloon NEAR the wall **without letting go.** Observe the charges in the wall.

**What happens?**

**Explain why this happens in terms of the charges.**

**Does the SURFACE of the wall now have a charge? If so, what kind?**

**Which of the 3 methods of charging does this represent? Why?**

7. Bring the balloon away from the wall.

**What happens?**

**Does the SURFACE of the wall now have a charge? If so, what kind?**

7. Place the balloon **NEAR** the wall and let go.

**What Happens?**

**Explain why this happens in terms of the charges.**

4. Place the balloon about half way between the wall and the sweater and let it go.

**What object (wall or sweater) is it more attracted to?**

**Why do you think it would be more attracted to this object and not the other one? Explain in terms of charges.**

**Part 3: Experimentation**

Click on 2 balloons and charge up the second balloon. Move the balloons around and see what happens.

**How do the 2 charged balloons interact with each other? Why?**

**Part 4: Grounding**

**Go to the following website:** [**https://phet.colorado.edu/en/simulation/travoltage**](https://phet.colorado.edu/en/simulation/travoltage) **then click “run now”. Follow the directions below and answer the questions as you go…**

1. Rub John Travoltage’s foot on the carpet.

**What happens?**

**What do the “blue spheres” represent?**

**Does John have a charge? If so, what kind?**

**What method of charging would this be?**

2. Make John touch the doorknob.

**What happens?**

**Does John still have a charge? If not, where did it go?**

**What do you see between John’s finger and the doorknob?**

3. Keep John’s finger near the doorknob, and rub his foot on the carpet.

**Are you able to give him a charge? Why/Whynot?**

**Analysis/Review Questions:**

1. In part 1 and 2 (the balloon experiments) was this an example of static electricity or current electricity? Explain your answer.
2. What two methods of charging were used in the balloon experiments?
3. Think back to the Chemistry Unit. What part of the atom do the
   1. Positive charges represent?
   2. Negative charges represent?
4. Which charges (positive or negative)
   1. Were the ones to move or transfer?
   2. Which ones didn’t move?
   3. Using our model of the atom, why do you think this is so?
5. What method of charging was used to give John Travoltage a charge?
6. When John had a charge, would this have been static or current electricity? Explain why.
7. When John touched the doorknob, we saw an electric discharge.
   1. Where were the charges trying to go?

b. Was this an example of static or current electricity? Explain why.