**Static Electricity Investigations**

Homework – Due 9/10

**Lightening on a smaller scale:**

Go to <http://PhET.colorado.edu>. Choose “play with sims”, “By Grade Level”, “Elementary School” and bring up *John Travoltage.*

1. What are the similarities and differences in the two models represented by *Balloons and Static Electricity* and *John Travoltage*?

Both are showing the effects of static electricity, the movement of electrons from one object to another. In Balloons the electrons move from the sweater to the balloon. In Travoltage electrons are rubbed from the carpet onto John’s shoe.

In Balloons, the electrons are represented as blue negative signs but in Travoltage they are shown as blue circles.

1. Describe what is happening when John touches the doorknob.

When John touches the door knob, all the excess electrons that are now in his body from rubbing his foot, are attracted to the metal doorknob and leave his body. The metal is a conductor which means there are electrons that are free to move. When these free electrons are near the negatively charged John, they move to a far area of the door knob, leaving the near area positively charged. This attracts John’s electrons so they jump to the knob.

1. If you rub his foot more times on the carpet, will his hand be closer or further from the door knob when the sparks fly?

If you rub his foot more times, more electrons are brought into John’s body. Then when you bring the hand to the knob, they are able to fly to the knob sooner since the force is stronger. The force is stronger because there are a lot more electrons in John’s body that don’t like each other and want to get out.

1. What do you think happens when you scuff your feet, build up a charge and then you touch your friend on the ear and shock them? Draw a picture including some sort of visual of the excess charges and how they move.

The excess electrons in your body want to get far from each other because they are like charges. When you touch your friend, they can get further away from each other by moving into him/her. They want to spread out evenly so that each one is as far as it can be from the rest.

1. Do you think all of the excess charge that you had will go to your friend or will some of it stay with you?

If all the excess electrons left you and went into your friend, your friend would have all the excess charge and this wouldn’t’ make sense since the electrons were trying to get away from each other. They aren’t going to all move to the same spot if they want to be apart. They spread out as evenly as possible which means half to your friend and half to you. (unless your friend Is much bigger than you, then they split proportionately.)

1. If all of the extra charge goes to your friend, should they be able to shock you back now? Is this what has happened in your experience? (try it out on your roommate or friend – tell them it’s HW and you had to do it!)

If they have exactly as much excess charge as you, then the electrons are not going to move. You’re even and no exchange occurs.