

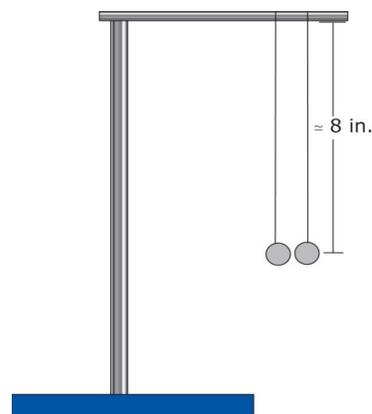
# Worksheet: Static electricity

Name: \_\_\_\_\_ Group name: \_\_\_\_\_

The main goal of this lab is to **show** by experiment that there are **two** kinds of charge, which we call “+” and “-”, respectively. You will use a device called an electrometer.

**Note:** several times you will need to remove charge from an object. We do this by making contact with another object that can soak up a great deal of charge easily, for example by touching you or better the metal cover on the electrical outlet or a wire connected to it.

1. Make a **pith ball electrometer**<sup>1</sup>: tear the foam “peanut” in half and tie a string around each. They each should hang about 12 inches below the rod with the loop around the rod loose enough that they can be moved back and forth. Next carefully unwrap **two** chocolate kisses preserving the foil intact, then smooth the foil. (What you do with the chocolate is entirely up to you.) Finally, carefully wrap the foam balls with the foil. The role of the conductive foil is to allow charge to flow freely over the surface of the pith balls.



- Remove one ball and string from the stand. Charge the white Teflon rod by rubbing on the fur until you get a nice crackling sound. Once you’ve charged the rod, bring it close to the ball – but do not touch the rod the ball (this make take a few tries).

The force between rod and ball is (circle one)    attractive    repulsive    no force    .

- Next touch the rod to the pith ball. Next bring the rod close, but don’t touch the ball a second time.

The force between rod and ball is (circle one)    attractive    repulsive    no force    .

- What happened when touched the pith ball with the rod?

<sup>1</sup> We call our little charged objects “pith balls” because in the 18<sup>th</sup> century these experiments were performed with balls made from balsa wood or other soft wood commonly referred to as “pith”

2. Attach the second ball to the stand close to the first and make sure the balls are level. Slowly bring the rod from the side towards one ball.

- What happens to the **either** ball before you touch the rod to the first ball? Why?

- Transfer some of the charge to both balls so that they have the same sign charge as the rod. Rub the **nylon** rod with the fur and bring close to the balls.

The force between rod and balls is (circle one)    attractive                  repulsive                  no force    .

- Try transferring charge from the **Nylon** rod to the balls. Next charge the **Teflon** rod and bring it close to the charged balls. From what you observe:

The charges on the Nylon and Teflon rods are (circle one)                  the same                  opposite    .

3. Place a metal soda can on its side on the table and make it move without touching with each rod. The can is not charged. Record your observations. How and why does the can move?

4. Balance a wooden meter stick on the glass dome and make it spin with both the charged nylon and the charged teflon rod. Record your observations. How and why does the meter stick move?

5. How does it follow from these experiments that there are two kinds of charge, “+” and “-”?