

Lab 32-1b: Electrostatics

Top = _____

Bottom = _____

Activity 4: Charging by Contact.

- a. Suspend a graphite-coated sphere from a stand so that it can swing freely in any direction without touching anything.
- b. Give a rubber rod a charge through friction. Bring it near the sphere. What happens? Be careful, there are couple things that happen!
- c. The sphere should end up getting charged from part b. What are the charges of the rod and sphere?
rod = _____ sphere = _____
- d. Hold the sphere for a moment to remove any charge it may have. Charge up a piece of acrylic by friction. Bring it near the sphere. What happens?
- e. The sphere should end up getting charged from part b. What are the charges of the strip and sphere?
strip = _____ sphere = _____
- f. Hopefully, in both cases above, the sphere was initially attracted to both of the objects. Why?
- g. Hopefully, in both cases above, the sphere was suddenly repelled by both of the objects. Why?
- h. Again, remove any excess charge the sphere may have. Charge up a piece of acrylic, and bring it close to the sphere. After the sphere has been charged, bring a charged rubber rod close to it. What happens?
- i. Describe what happened to the charge of the sphere in doing part h.
- j. What is meant by the phrase *charging by contact*?

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Activity 5: Charging by Induction. Try and actually follow the directions.

- a. Charge up the piece of styrofoam by rubbing it lightly with a piece of fur. What are the charges of the styrofoam and fur? (Test the fur first, as it will lose its charge faster than the styrofoam.)

styrofoam = _____ fur = _____

Were these things charged by *contact* or by *friction*?

- b. Place a pie tin on top of the charged Styrofoam. (Use the coffee cup holder when handling the tin.) Briefly touch the pie tin. What happened?

- c. Now pick up the pie tin, but make sure you only hold on to the coffee cup holder. What is the charge of the pie tin and the styrofoam?

styrofoam = _____ pie tin = _____

- d. Bring it near a graphite-coated sphere. What happens?

- e. What do you think happened to the charges of the pie tin and the sphere? What would you call this process?

- f. Again, holding on to the coffee cup holder, place the pie tin on the Styrofoam, and then touch the pie tin. Now pick up the pie tin by holding on to the pie tin itself. Bring it near the graphite coated sphere and also determine the charge of the pie tin. What happened?

pie tin = _____

- g. Holding on to the pie tin itself, place the pie tin on the Styrofoam. Still holding onto the pie tin itself, pick up the pie tin and determine the charge of the pie tin and the effect on the graphite-coated sphere.

pie tin = _____

- h. Lastly, holding onto the pie tin, place the pie tin on the styrofoam. If you now touch the pie tin, nothing should happen. (Like in part g.) Pick up the pie tin by holding onto the coffee cup. What is the charge of the pie tin now and what is the effect on the graphite-coated sphere?

pie tin = _____

- j. Can you charge the pie tin by (holding onto the cup) bringing it close to, but not touching, the styrofoam and then briefly touching the pie tin?

- k. What happened to the charge on the styrofoam during this process? Did the pie tin ever do anything to the styrofoam?