

Name _____
Physics
Period _____

Date _____
Lab #29 (50 pts)
Mrs. Nadworny

Partners: _____

Due Date: _____

Static Electricity

NO Lab Write-Up Required

Purpose To investigate different properties of static electricity

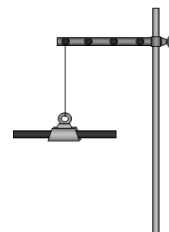
Materials

- | | | | |
|---------------------------------------|---|--|----------------------------------|
| <input type="checkbox"/> 2 black rods | <input type="checkbox"/> 2 clear strips | <input type="checkbox"/> Fur | <input type="checkbox"/> Pie pan |
| <input type="checkbox"/> Silk | <input type="checkbox"/> Paper bits | <input type="checkbox"/> Binder clip | <input type="checkbox"/> Cup |
| <input type="checkbox"/> Ring stand | <input type="checkbox"/> Soda can | <input type="checkbox"/> Pink insulation | <input type="checkbox"/> Tape |

Procedure (All observations 1 pt each)

o **Part A - (Testing a Charge using a Hanging Rod)**

1. Set up a ring stand with a cross bar and hang a binder clip from it using some string.
2. Clamp the binder clip onto the middle of one rod so that the rod pivots freely horizontally.
3. Charge the hanging black rod by rubbing it with the fur. This combination of materials results in the **rod being negatively charged**.
4. Charge another black rod with the fur. Predict what will happen if you bring this rod near the hanging rod.



5. Bring the second charged rod near the hanging rod, but do not touch them together. Record your observations.

6. Charge the clear plastic strip with the silk by rubbing them together. This combination of materials results in the **plastic being positively charged**.
7. Predict what will happen if you bring this plastic strip near the hanging rod.

8. Bring the charged clear strip near the charged hanging rod, but do not touch them together. Record your observations.

9. Remove the hanging rod and replace it with one of the clear plastic strips. Clamp the binder clip onto the middle of the strip so that it pivots freely horizontally.

- 10. Charge the hanging clear strip by rubbing it with the silk.
- 11. Charge the other clear strip with the silk. Predict what will happen if you bring this strip near the hanging strip.

- 12. Bring the second charged strip near the hanging strip, but do not touch them together. Record your observations.

o **Part B - Separation of Charge (Attracting Neutral Objects with a Charged Rod)**

- 13. Take a small handful of the paper bits and place them in a pile.
- 14. Charge the black rod by rubbing it with the fur. Predict what will happen if you bring the charged rod near the paper bits.



- 15. Bring the charged rod near the pile of the paper bits. Record your observations.

- 16. Charge the clear strip by rubbing it with the silk. Predict what will happen if you bring the charged strip near the paper bits.

- 17. Bring the charged clear strip near the paper bits. Record your observations.

- 18. Lay an empty soda can on its side.
- 19. Charge the black rod with the fur. Predict what will happen if you bring the charged rod near the soda can.



- 20. Hold the rod horizontally next to the can without touching them together. Record your observations.

21. Charge the clear strip by rubbing it with the silk. Predict what will happen if you bring the charged strip near the soda can.

22. Bring the charged clear strip near the soda can. Record your observations.

23. Go to the sink and turn the water on very low. There should be a **very** thin stream of water.

24. Charge the black rod with the fur. Predict what will happen if you bring the charged rod near the stream of water.

25. Bring the charged rod near the stream of water. Record your observations.

26. Charge the clear strip by rubbing it with the silk. Predict what will happen if you bring the charged strip near the stream of water.

27. Bring the charged clear strip near the stream of water. Record your observations.

Part C – Separation of Charge (The Electrophorus)

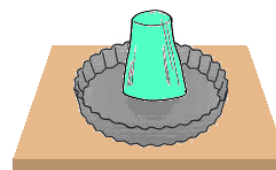
28. Tape a cup upside down to the center of the pie pan, as shown.

29. Rub the fur over the pink foam base of the electrophorus then remove the fur.

30. Pick up the pie pan by the handle (paper cup) and place it on the pink foam base.

31. Touch the edge of the plate with your finger and then remove your finger.

32. Record your observations.



33. Pick the plate up from the pink foam base using the handle. While it is still in the air, touch the plate with your finger.

34. Record your observations.

35. Repeat the above steps 10 times by setting it down, touching the edge, then picking it up and touching the edge repeatedly.

36. Record your observations.

Questions

1. a. What was the charge on the plastic strip before rubbing? after rubbing? (2 pts)

b. Give some evidence from your experiment to support your conclusion. (2 pts)

c. What was the charge on the silk before rubbing? after rubbing? (2 pts)

d. What was the total charge of the silk-strip system before rubbing? after rubbing? (2 pts)

e. How was charge conserved in this system? (2 pts)

2. What effect would rubbing the black rod or clear strip for a longer time have on the outcomes of your experiments? Why? (2 pts)

3. Why didn't the charged black rod ground (discharge) through your hand when you held it? (2 pts)

4. Would the electrophorus remain charged indefinitely? Explain. (2 pts)

5. Why are these experiments best done on a dry day rather than a humid day? (2 pts)

6. According to the results of your experiments, make a conclusion about the effects charged objects have on neutral objects. (2 pts)

Conclusion (9 pts)

7. What did you learn in part A? Explain using several complete sentences.

8. What did you learn in part B? Explain using several complete sentences.

9. What did you learn in part C? Explain using several complete sentences.
