

# Flask Form Electroscope Worksheet

## Observations

### Charge by Induction

Electroscope response to the negatively charged friction rod

Electroscope response to the positively charged friction rod

### Charge by Conduction

What happens when the negatively charged friction rod touches the metal ball of the electroscope and is then removed?

How does the electroscope respond with the positively charged friction rod?

What happens when the charged electroscope is touched by a finger?

### Permanently Charge by Induction

Describe the process of permanently charging by induction. Use a sketch, if desired, that includes the charge on the friction rod, and the corresponding charge on the foil leaves.

How does the charged electroscope respond to the charged friction rod after being permanently charged by induction?

### Post-Demonstration Questions *(Answer on a separate sheet of paper.)*

1. Does an electroscope indicate the type of charge (positive or negative) that it carries?
2. Does charging by induction leave an electroscope permanently charged?
3. What is the charge on an electroscope when it is charged by conduction using a negatively charged friction rod?
4. An electroscope is permanently charged by induction using a glass rod that was rubbed with silk. A rubber rod rubbed with flannel is then brought near the electroscope. How will the foil leaves respond? Explain.
5. Describe how an electroscope may be used to determine the polarity of an unknown charge on an object.

# Electrophorus and Condensing Electroscope Worksheet

## Electrophorus

Describe the response of the electroscope. Does the electrophorus appear to have more or less charge than the original friction rod?

Describe the processes of charging the electroscope with the electrophorus and with the friction rod. Which apparatus appears to charge the electroscope better—the electrophorus or the friction rod?

## Condensing Electroscope

Compare the sensitivity of the condensing electroscope to the “normal” flask form electroscope.

## Post-Demonstration Questions *(Answer on a separate sheet of paper.)*

1. Describe how to charge the electrophorus.
2. Why does the condensing electroscope respond to the same charged friction rod with foil leaves that diverge further compared to the “normal” electroscope?

# Charge Distribution and Discharge Worksheet

## Observations

What happens to the foil leaves when one charged electroscope touches an uncharged electroscope?

When the pin makes contact with the charged electroscope, what happens to the foil leaves?

What happens to the electroscope when the pin is held near the electroscope and is then touched by the charged friction rod?

## Post-Demonstration Questions *(Answer on a separate sheet of paper.)*

1. Why does the pin discharge the electroscope?
2. Explain how the pin charged the electroscope, even when no contact was made.
3. Do you believe the purpose of a lightning rod is to attract lightning, or to prevent lightning strikes? Explain.

# Faraday's Cage and Pail Worksheet

## Faraday's Cage

How does the electroscope respond when the charged friction rod is brought near it?

Describe what happens when the friction rod is brought near the charged electroscope surrounded by the Faraday cage.

## Faraday's Pail

Does the proof plane collect any static electric charge from the outside surface of the metal tube (pail)? How can you tell?

Does the proof plane collect any static electric charge from the interior surface of the metal tube? How can you tell?

## Post-Demonstration Questions *(Answer on a separate sheet of paper.)*

1. Do static electric charges travel through the Faraday cage? Explain.
2. What is the purpose of the proof plane?
3. Why do you believe charges do not accumulate on the inside of a metal container?
4. Do you believe it is safer to sit inside a car or lie underneath a car during a lightning storm? Explain.

# Curving Water into a Beaker

## Observations

What happens to the water as it flows past the charged comb? Draw a picture.

## Post-Demonstration Questions *(Answer on a separate sheet of paper.)*

1. Draw a picture of the shape of a water molecule. Which atoms in the molecule tend to be more negative and which tend to be more positive?
2. Why is water easily polarized by an external electric charge?