

Simple Electroscope

Materials:

- Glass Jar or Drinking Glass
- Aluminum Foil
- Index Card or plastic lid
- Paperclip
- Tape
- Balloon

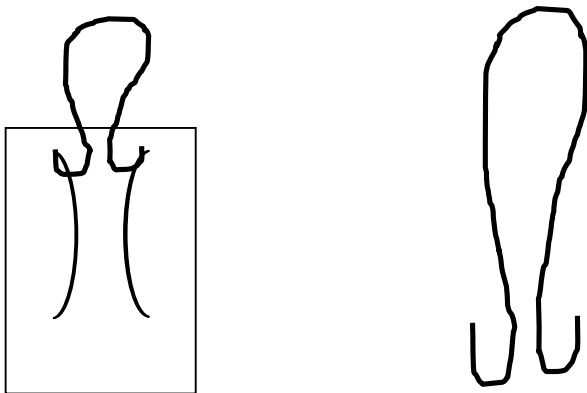
Background:

An electroscope is an instrument for detecting the presence of static electricity. It consists of two thin metal leaves suspended from a metal hook. When the hook is brought near a source of static electricity, some of the electrons in the hook are pushed to the leaves (if the source is negative) or pulled up to the hook from the leaves (if the source is positive). Either way, the leaves are now [charged](#) the same way as each other and so they repel each other. The amount they open up is proportional to the charge of the source (if the sources are always held at the same distance from the hook).

Procedure:

Cut two strips of foil 1cm by 4cm (1/3" by 1 1/2") Open out the paperclip to form the shape below. Push the hook through the middle of the index card and tape so that it is at right angles to the card. Lay the two foil strips on top of one another and hang them on the hook by pushing the hook through them. Lay the card over the jar so that the strips hang inside (see picture below).

Bring various charged objects near the hook and observe what happens. Notice what happens to the strips when the sources are removed. Does anything different happen if the source actually touches the hook? If the strips do not fall back together, gently touch the hook with your finger.



1. Blow up the balloon and bring it near the constructed electroscope. Note what happens (or doesn't!).
2. Rub the balloon on your head/the carpet/someone else's head to build up a static charge on the balloon. Slowly bring it close to the top of the electroscope WITHOUT touching it. Note the behavior of the leaves.
3. Repeat step 2, only this time, allow the balloon to touch the loop at the top of the electroscope. Again, pay attention to what the foil leaves do.
4. Finally, repeat step 2, but while holding the balloon near to (but not touching) the electroscope, rest a finger from your free hand on the loop of the electroscope. Notice the behavior of the foil leaves. Now, quickly remove your hand and the balloon from the electroscope. Look carefully at the leaves and their position. Try touching the loop to see if anything interesting happens.

Your assignment is to construct a working electroscope (we'll do this in class) and type a 1 page paper (you'll do that at home) explaining what an electroscope is, how it works, what it is used for, and the items you discovered in your house (or elsewhere) that generate an electric field. Give special attention to the 3 different setups from steps 2-4 above.