Electrostatic Charging

TOPICS AND FILES

E&M Topic

Methods of charging

Capstone File

64 Charging.cap

EQUIPMENT LIST

Qty	Items	Part Numbers
1	PASCO Interface (for one sensor)	
1	Charge Sensor	CI-6555
1	Charge Producers and Proof Planes	ES-9057A
1	Faraday Ice Pail	ES-9024A

INTRODUCTION

The purpose of this activity is to investigate the nature of charging an object by contact as compared to charging an object by induction. You will also determine the polarity of two charge 'producers' and measure the amount of charge on each. Use a charge sensor and the *Capstone* software to record and compare the polarity and charge.

BACKGROUND

Electric charge is one of the fundamental properties of matter. Electrostatics is the study of electric charges and their characteristics. For example, like charges repel and unlike charges attract. An object is electrically neutral most of the time; that is, it has a balance of positive and negative electric charges. Rubbing different materials together, contact with a charged object, and charging by induction are three ways to create an imbalance of electric charge—sometimes called static electricity.

To experimentally investigate electrostatics, some charge-detecting or measuring device is needed. A common instrument for this purpose is the electroscope, a device with two thin gold leaves vertically suspended from a common point. When a charged object is brought near the electroscope, the gold leaves separate, roughly indicating the magnitude of the charge.

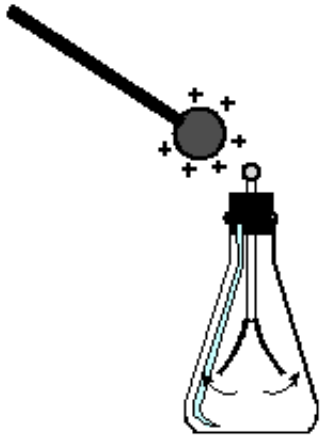

Figure 1

Although there are many different versions of the electroscope, all such instruments depend upon the repulsion of like charges to produce an output or reading. Unfortunately, such devices are relatively insensitive (large amounts of charge are needed to make the gold leaves separate), and the device does not have a quantitative reading.

The charge sensor is an 'electronic electroscope'. In addition to providing a quantitative measurement, the charge sensor is more sensitive and indicates polarity directly.

