Dual Purpose Electroscope

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Introduction

Electricity is familiar to almost everyone. It is used in countless applications, and is the backbone of our civilization. Despite this, the workings of electricity are often a mystery to many people.

One of the main difficulties students have with electricity is the fact that it is invisible. Light can technically not be seen, but its effects are visible. Heat falls midway between light and electricity. Electricity, by itself, can only be seen during a discharge, such as lightning.

Fortunately, electricity has effects on objects, and these effects can be seen. For this purpose, the electroscope was invented. This makes understanding the concepts of electricity much easier.

John Canton invented a type of electroscope utilizing a pith ball in 1754. Abraham Bennet invented a more complex model that used two leaves of gold foil in 1787. Both instruments demonstrated the same thing: an electric charge could induce motion and other effects onto real world objects.

The reason for this is a fundamental law of electricity: like charges repel one another. In addition, if conductive surfaces are in contact with one another, a charge will be evenly distributed upon all of them. Thus, of one part of the conductive apparatus is free to move, an electrical charge will cause it to be repelled from the other parts. This is called a Coulomb force. This concept will be explained in greater detail below.

In your dual-purpose electroscope, you will notice a single piece of gold foil, and a scale. When brought into the presence of a charge, the foil will be repelled from its PTFE backing. It will bend, indicating a value on the scale. The scale is not calibrated, so the foil can only display relative magnitude.

The extreme malleability of gold allows it to be beaten into sheets slightly thicker than one gold atom. Due to this, the foil is incredibly fragile. Never handle it with your hands. There are two additional replacement strips included with the electroscope. If you find you must replace the foil, handle the spares with tweezers and be very careful when handling them. Use a tiny dab of glue to hold it in place.