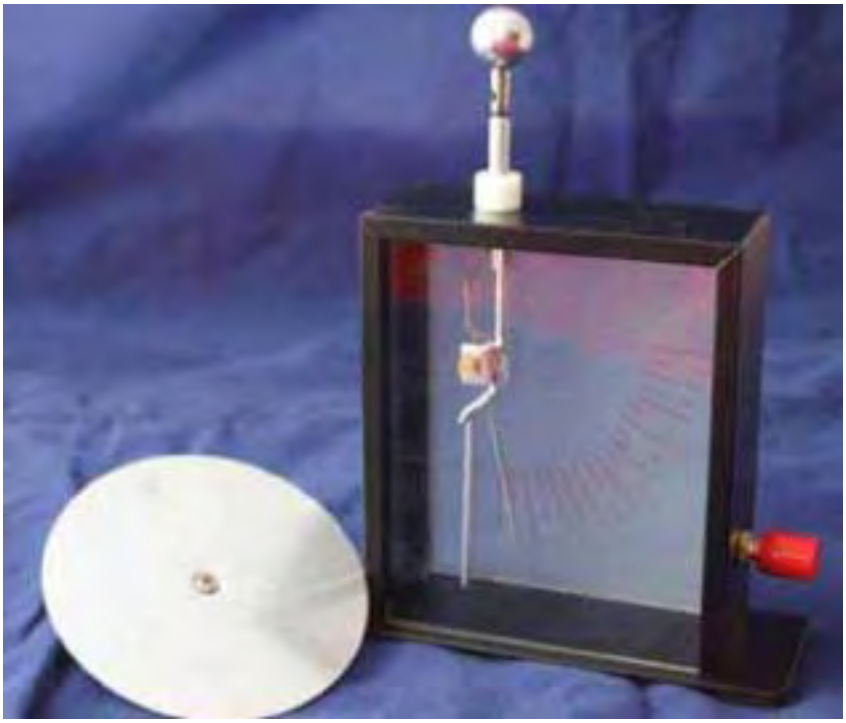
615-3000 (10-047) Square Electroscope



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.

A type of electroscope utilizing a pith ball was invented in 1754 by John Canton. A more complex model that used two leaves of gold foil was invented by Abraham Bennet in 1787. Both of these 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.

Description: Your electroscope is ready to use right out of the box. Simply stand it on its feet on a stable surface. You will also need a source of charge. This can be as simple as a set of charging rods, or as complex as a Van de Graaff generator.

You will notice that your electroscope contains a needle that is free to pivot. This needle is connected by a conductive shaft to its housing, which in turn is connected to the ball on top of the electroscope. These

conductive surfaces are insulated from the metal casing by plastic hardware. This last part is essential: of the charge could flow from the needle assembly to the metal casing of the electroscope, the charge would pass through the feet, creating a ground.

When you have produced a source of electrical charge, bring it near the ball. The charge will pass into the ball, down into the housing of the needle, and finally into the needle itself. We learned above that a charge would be evenly distributed across a conductive material. This means that the needle and it's housing have the same charge. Since like charges repel one another, the needle has no choice but to move as far from the housing as it can. The needle can only pivot, so the red tip will deflect until the Coulomb force is equal to gravity. The Coulomb force is the force produced by electrical repulsion.

You will find that the degree of deflection depends upon the strength of the charge. A charging rod will affect the needle a small amount, whereas a Van de Graaff generator will likely push the needle past the limits of the scale at close ranges.

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain lead or small parts that can be choking hazards. Adult supervision is required.

May we suggest:

615-3100 Van De Graaff 200Kv Generator, Assembled: 200 kV potential (arcs to 5")
Fully assembled or in an easy to assemble kit.
45 cm high, 18 cm (7") diameter oblate.
Operates in humidity up to 90%.
Spare neoprene belt.
1-3/4" diameter opaque PVC column.
615-3105 kit assembles with basic tools, ages 10 up.
Pairs with 615-3115 Discharge Wand and many other accessories.