

INSTRUCTIONAL GUIDE

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- Instructional Guide

Recommended for activities:

- [Proof Plane \(96-3585\)](#)
- [Friction Rod Kit \(P6-1600\)](#)
- [Electroscope \(P6-1156\)](#)
- Cellophane tape and/or balloon



Background

All atoms are naturally charged. This is because protons and electrons naturally carry a positive or negative charge. A stable atom usually has an equal number of protons and electrons, giving it a neutral charge. However, it is possible to transfer electrons from one atom to another. This occurs every day in nature, and is called static electricity. The effects of the atmosphere sliding over itself is sufficient to produce vast amounts of static electricity; lightning is simply the discharge of this energy.

Electroscopes are devices that respond to changes in static electricity. Though static electricity is invisible most of the time, an electroscope can visually demonstrate a charge. Consider a standard leaf electroscope: as a charged object is brought near, the leaves move apart. This is a much better way of demonstrating static electricity than a simple spark discharge would be.

The Static Charge Indicator takes the concept one step further. Instead of using silver foil or pith balls, this variant uses LED's. A transistor present inside the device responds to changes in voltage that a charged object induces in the dome-shaped brass antenna. Most electroscopes require hundreds or thousands of volts to activate the moving foil leaves. The Static Charge Indicator is much more sensitive, responding to only a few tens of volts. Simply rubbing a plastic pen on your shirt several times is enough to trigger an unambiguous response from the LED charge polarity indicators.

Introduction

Enclosed in a sturdy blue case, our Static Charge Indicator is extremely accurate and exceptionally durable.

1. **Leave the unit in the off position to start.**
2. Charge a rod or other object, and hold it within a few centimeters of the dome-shaped brass antenna without touching the object to the antenna.
3. Now turn the unit on.

If the charge is negative, the green LED will illuminate. When you remove the rod, the red one will illuminate.

If the charge is positive, the red LED will light when you switch the unit on. When the charge is removed, the green LED will light up.

The center push button will reset the electroscope. The default mode for the LED's is the red LED is illuminated and the green LED is dark.

If the object tested has no charge, the red LED will glow as it does upon start-up by default, even when no object is held near the antenna. When the uncharged test object is moved away from the antenna nothing will change and the red LED will stay on, the green LED will remain off.

Related Products

E-Field Detector (96-3580) Using the E-field detector, teachers and students can investigate the effects of positive and negative charge. The probe of this detector can "sniff out" unknown charges, demonstrate charging by induction, and even prove the inverse square dependence of Coulombs Law.

Friction Rod Kit (P6-1600) Explore charging by friction, positive and negative charge, and attraction and repulsion with the friction rod kit. Includes glass and hard rubber rod, silk and faux fur pads, bubble wrap, glass rod mounted on pivot needle, and complete instructions.

Demonstration Electroscope (P6-1170) This aluminum needle-based electroscope's design makes it superior to traditional leaf-style electroscopes in part because the needle stays put when experiments are being performed.