615-3060 (10-050) Electroscope Instructions

Replacement Parts List

Electroscope, no flask	615-3060
Foil leaves	91-0051
Instructions	24-0050

Additional Materials Required but not included:

250ml Erlenmeyer Flask
Charged Rod

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 small parts that can be choking hazards. Adult supervision is required.

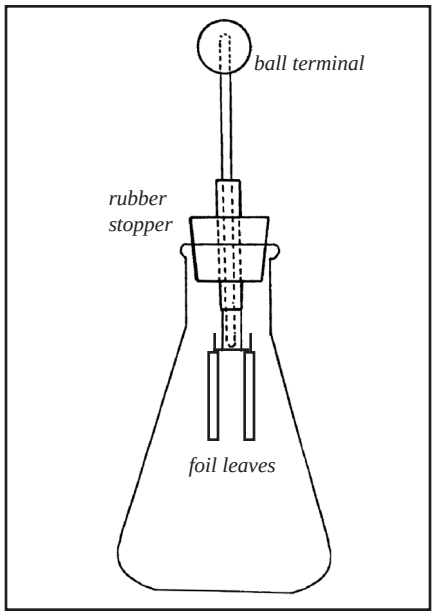
Introduction:

This device converts your existing glassware into a simple electroscope. Any bottle or flask which accepts #6 rubber stopper will work. If the flask you have chosen requires a different stopper, you may remove the stopper and insert another.

How To Use:

Hang two leaves of aluminum foil (included) on hooks of brass hanger by means of small holes at one end of each leaf. Insert the assembly into a flask as seen above.

Approach the ball terminal with charged rod (not included) and observe the results.



Theory:

An electroscope detects and identifies an electric charge. It demonstrates that two similarly charged objects repel. In this instance the repelled objects are 2 metallic leaves which are light and movable and are electrically connected by means of an insulated aluminum rod and brass hanger. Since they are electrically connected, they must have the same electrical charge.
The stronger this electric charge, the more the leaves repel, or diverge.

To Charge By Contact:

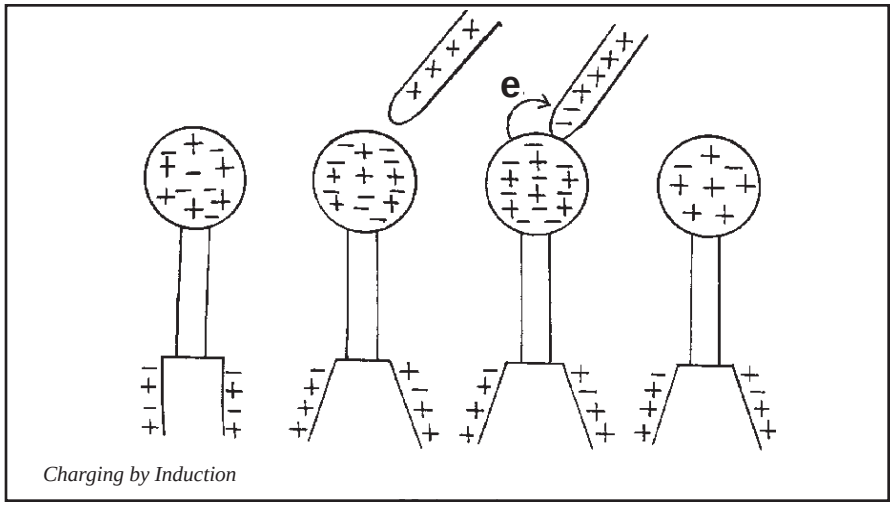
In a neutral electroscope, both positive and negative charges are evenly distributed and the metallic leaves are collapsed. A positively charged rod approaching the ball on top of the electroscope will attract the electrons away from the leaves and up into the ball. This makes the charge on the leaves positive and the charge on the ball negative. Since the leaves share the same charge, they diverge or repel. If the charging rod touches the ball, some electrons are conducted from the knob onto the positive rod. When the rod is removed, it is less positive than before. The electroscope, however, has lost electrons and has a positive charge.

Any object charged by contact always has a charge the **same sign** as the charging body.

Since a strong charge may tear the thin leaves of a foil electroscope, a proof plane or transfer ball is required to transfer the charge from the electrophorus to the electroscope.

To Charge By Induction:

Bring a negatively charge rod close to, but not in contact with, the ball terminal. Electrons are repelled from the ball and enter the leaves, causing them to diverge. The ball is now deficient in electrons.



Charging by Induction

Removing the charge rod causes the electrons to return to their original positions. The leaves collapse.

Bring a positively charged rod close to, but not in contact with, the ball terminal. Again the leaves diverge. The ball has a surplus of electrons, since the electrons in the leaves have been attracted up into the ball.

Touch the ball briefly with your finger. Electrons now flow up from the earth, by means of the contact between your finger and the ball, to replace the electrons lost by the leaves. The leaves revert to their neutral state and collapse.

When you remove your finger, the leaves remain collapsed and the ball retains some extra electrons which are held there by the repelling force of the charged rod.

When you remove the charging rod, the extra electrons have no way of returning to earth. Some move away from the leaves to enter the rod and ball terminal. The electroscope therefore has an overall negative charge. This situation can be neutralized by touching the ball terminal briefly

The same effect occurs if the ball terminal is touched when approached by a rod with a negative charge.

Any object charged by induction always has a charge of the **opposite sign** as the charging body.

Visit us at: www.sciencefirst.com

Related Products:

You may be interested in the following products. They may be purchased directly from the manufacturer **Science First.**

615-3015 Friction Rods Kit

Hard rubber, glass and PVC rods; cotton, acetate and rabbit fur pads. Instructions.

615-3090 Electrostatic Charge Kit

Make electricity by friction; store and transfer it. Demonstrate principle of electrophorus and action of proof plane. Includes electrophorus with acrylic charge plate and insulating handle; 6 friction rods; acetate cloth; polyethylene film; proof plane with ball; neon lamp; graphite ball with hook; 12 pith balls; instruction booklet.

615-3075 Electroscope Kit

An extension of the **615-3060** Electroscope Kit. Detect and identify electrical charges. Includes: 2 foil leaf electroscopes with flasks; foil leaves, 2 ball terminals; aluminum ice pail; 2 disc terminals; instruction booklet.

615-3095 Faraday Cage Kit

Demonstrate that charge cannot exist inside a conductor cage. Study lightning rod effect. Consists of: Faraday Cage with fitted stand and cover; mounted point; instructions.

615-3078 Metal Case Electroscope

Classic electroscope with 10cm square glass viewing area. Includes 2 pair metallic leaves, brass hanger with insulator and ball terminal, 10 x 10cm glass panels, instructions.

615-3205 Leyden Jar

Charge it, dissect it - holds charge for hours. Contains 2 aluminum cans, polystyrene dielectric jar, aluminum electrode, instructions.

615-3100 Van de Graaff Generator

Exciting study of electrostatic repulsions and attraction; charging, discharging, charge distribution, lightning. Choose 200,000 volt potential available in assembled (615-3100) or 400,000 volt potential, in assembled form (615-3130).

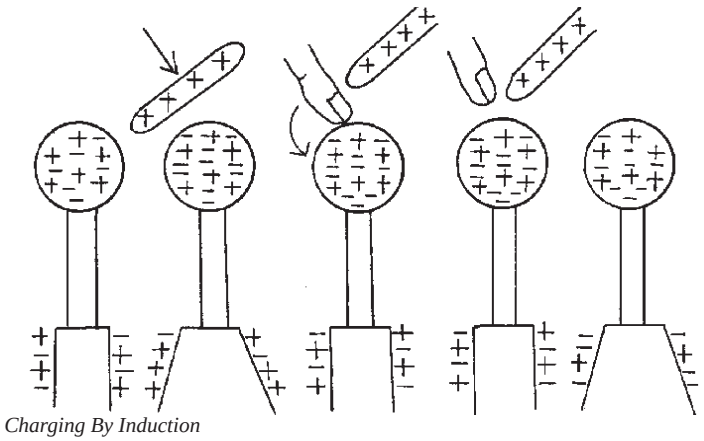
615-3190 Wimshurst Machine

This easy-to-use device consists of two high resistance plastic discs 25cm in diameter with equally spaced metal sections. The discs are supported with two upright posts and rotate in opposite directions with a hand crank, producing substantial opposite charges which are deposited in the capacitors and on the metal electrodes. You can collect induced charge with the brushes and adjust the electrodes and Leyden jar capacitors for higher potential, thus generating sparks by lowering the systems's capacitance. Mounted on wooden base.

How To Teach with Electroscope Kit:

Concepts Taught: Electrostatic repulsion; charge identification; electrostatic induction and conduction.

Curriculum Fit: Grades 6-8, PS/ Electricity & Magnetism. Unit: Static Charge.



Charging By Induction

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