

32640 PITH BALL ELECTROSCOPE

Purpose:

To indicate the presence of electrostatic charges.

Additional Required Materials:

Materials to generate static charges (vinyl, acetate, glass, wool, cotton, fur, etc)

Glue

Common Pin

Assembly:

Begin by attaching the base to the insulating stand. Then attach a length of monofilament approximately 8 inches long to each of the pith balls. With a common pin or needle, poke a small hole into the end of the pith-like ball (near the mold mark). Insert one end of the monofilament and hold it in place with a small drop of glue. When the glue is completely dry, gather up all of the balls and let them dangle from the attached monofilament. All of the balls should be hanging about the same distance from your hand (approximately 5 inches). Adjust their lengths if necessary. Tie the loose ends of monofilament together. Hang the balls from the insulating stand by passing the loose ends of the monofilament through the hole in the end of the curved metal rod. Pull enough monofilament through the hole so that the balls hang approximately 1 to 2 inches above the table top. Tie off the monofilament.

Charging:

Charge a piece of plastic or glass by rubbing it with cloth or wool. Try different combinations of materials (plastic with cotton, plastic with wool, plastic with fur, etc.).

Touch the charged plastic to one of the pith-like balls dangling from the insulating stand. Charge is conducted from the one ball that was touched to all of the other balls that were in contact with it. At this point all of the balls that were in contact with each other all share the same sign charge (polarity). That is, if one has a positive charge, they all have positive charges. Immediately, all of the pith-like balls will repel each other and spread out; none touching any of the others. This demonstrates charge repulsion.

What happens when the charged wand is brought near the balls? They move away from the rod too. This is because the charging rod also has the same polarity.

Try charging a plastic rod with a different material. If the pith-like balls move away from this rod, you know that it too has the same polarity. If the balls move toward the rod, then the rod and balls have opposite polarities.

What happens when a conductor (such as your finger) is brought near the pith-like balls? You should find that they are attracted to it because the charge on the balls will induce an opposite charge on any conductor that is near it. These concentrations of opposite charge will attract each other. When they touch, the charge will be neutralized (or grounded).

Time Allocation:

Allow at least 30 minutes for assembly prior to using this product. Individual experiment times will vary depending on methods of instruction, but normally will not exceed one class period. Carefully store the apparatus while fully assembled and it will be ready for the next use.

Feedback:

If you have a question, a comment, or a suggestion that would improve this product, you may call our toll free number.