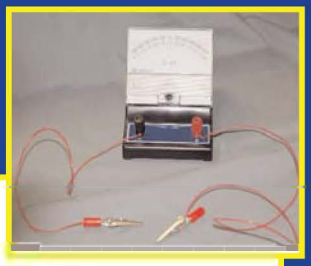
Experiment:

Build a galvanometer

Electric UNIVERSE

FirstEnergy



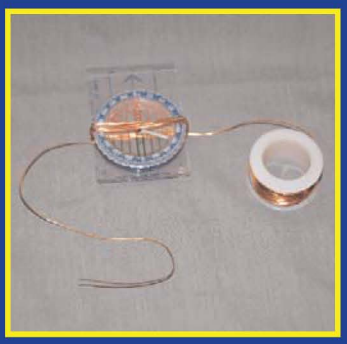
Commercial galvanometer

1. A galvanometer is a sensitive instrument which detects even small electrical currents. Commercial galvanometer are available from scientific equipment suppliers for use in the classroom. Additionally, many hand-held electric testers have a function for detecting small currents. These can be purchased at hardware and electronic stores.

However, it is possible to cheaply and inexpensively build a galvanometer in the classroom. The construction of the galvanometer can become a learning experience. Then, use the galvanometer to detect current in a variety of other electrical experiments.

2. Background: In 1820, the Danish scientist Hans Christian Oersted observed that electricity moving through a wire produced a magnetic field. He placed a copper wire on top of, and parallel, to a compass needle. When an electrical current was passed through the wire, he noticed that the needle turned away from the wire. This happens because an electrical current creates is own magnetic field. Since the current-carrying wire is parallel to the compass needle (a second magnet), the wire's magnetic field repels the field of the compass needle, causing it to turn away. Oersted proved that a magnetic field exists around every wire carrying an electrical circuit.

3. You can build your own classroom galvanometer and repeat Oerstead's experiment. Start with a compass. A toy compass will work, but a compass designed for orienteering, with a large needle and face, works better for school demonstrations. Take a spool of wire (thin, bare wire works well) and roll approximately 12 inches off of the spool. At this point, tape the wire to the back of the compass. Next, make several turns around the widest section of the compass face. Each loop increases the effect of the wire's magnetic field. Finish this step by taping the other end of the loop to the back of the compass face.



4. Set up the experiment with a switch (as shown), or connect one lead from the galvanometer to a battery terminal. Create your own switch by touching the other lead from the galvanometer to the opposite battery terminal when the current needs to be turned on. Remember: most "bare" copper wire has a insulating covering of varnish or paint. Be sure to sand the ends of each section of wire to ensure that good electrical connections are made.

5. Turn the galvanometer so that the compass needle and windings are parallel (both facing north and south). Turn on the current. The compass needle should swing at a right angle to the wire loops. If this does not happen, check all contact points on the circuit.