



Materials

- 1 GENECON with output cord
- 1 Polarity Tester
 - o Raw Potato

Procedure

1. Connect the leads of the GENECON to the two terminals of the Polarity Tester. Turn the handle of the GENECON in a clockwise direction. The diode will glow either red or green. If it emits a red light, the lead closest to the diode is of positive polarity. If the light is green, that same lead is negatively charged.
2. Reconnect the leads of the GENECON (if necessary) so that the red lead is at the terminal closest to the diode. Turn the handle of the GENECON (again, clockwise). The diode should glow red. If it does not, the output cord from the GENECON has been plugged in upside down. The red lead should be on top. This standard arrangement for using the GENECON (clockwise rotation, with red lead on top) will ensure that the red lead always has the positive polarity. Polarity is of little concern in many of the activities in this Manual, but some of them will not work if the prescribed polarity is reversed.
3. With the GENECON connected to the Polarity Tester, rock the handle back and forth. The alternating colors of the diode clearly show that by reversing the direction of the GENECON's handle, you are reversing the direction of the current.

Key Concepts

1. Electricity is the flow of the negatively charged particles, called electrons, through a conductor.
2. Electricity flows from the negative electrode (where there is a surplus of electrons) to the positive electrode (where there is a shortage of electrons).
3. The polarity of an electrical source refers to the location of the positive and negative electrodes.
4. The direction of the rotation of the GENECONs handle determines the polarity of its leads (connectors).
5. Whichever color (red or green) the diode glows, the positive lead is at the terminal of the same color as the diode.
6. Incorrect polarity may cause certain appliances to work improperly or become damaged.

Teaching Tips

1. Another less elegant but fascinating way of determining the polarity of the leads from a DC energy source (e.g. the GENECON, the capacitor, and electric cell) is to use a **raw potato**! Cut the potato in half, and then prepare two copper wires, each about 5 cm in length. With sandpaper, brighten up the ends of the wires and insert them into the potato about 5 mm apart and 5mm deep into the flesh of the potato. Be sure they do not touch each other. Then connect the wires of the GENECON and turn the handle vigorously. Within about 30 seconds you will note the formation of a blue-green color on the potato around one wire, but not the other. This color forms only on the positive wire. (It is copper chloride and is produced by the **electrolysis of natural salt** in the potato.)
2. Ask students to consider what happens when batteries are not installed properly in flashlights or radios. What does "properly" really mean?
3. Discuss the wider blade on one side of the plugs of typical electrical appliances. Such plugs will go into electrical outlets in only one direction. Why is this?

