

SCIENCE @ THE LIBRARY

ELECTRICITY

To allow students to create circuits and run lights, buzzers and fans powered by batteries or hand held generators.

MATERIALS:

colorful wires with alligator clips
assorted bells, lights, buzzers, switches
electricity board with stations
wooden paddles with attached propellers

WHAT TO DO:

When using electricity, remember you must have a complete CIRCUIT or circle – from energy source to object (if there is more than one) and back to energy source.

Note that metal conducts electricity but plastic does not. Note the metal ends of the wire and how they have to touch to conduct the flow of electricity. The alligator clips work by squeezing the fattest part of the clip and remind students to clip onto the wire.

Attach light or propeller to hand crank generator and have a student crank to make it work. If using propeller, see how direction of propeller changes with the change of direction of cranking (one way it blows on the face, the other way it blows on the hand holding the propeller).

Make a circuit with a switch – clip from power to switch, from switch to light/propeller/buzzer, and then back to power. When switch is up, there is a gap in the circuit and the electricity will not flow through. When switch is closed, the circuit is complete and the light/propeller/buzzer works.

NOTE:

You may want to prove to yourself that even with the two 6 volt batteries, there is not enough electrical flow to give much, if any shock. You can then reassure your student that this won't hurt them. Remind them that the electricity from the wall is MUCH more powerful and will hurt them if they put things into outlets.

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PROPELLER ACTION

Attach Propeller mounted on dowel to hand crank generator and have student crank it to make it work.

Show how direction of propeller changes with the change of direction of cranking – one way blows on the face, the other way it blows on the hand holding the propeller.

See how a hand-held generator can be a motor.

When the device is held and its crank is turned, electricity is produced in the wires; this device is called a **generator**. It is converting mechanical energy into electrical energy.

When the device is held and an electrical source is connected to the wires, the crank rotates, and that device is called a motor. **A motor** converts electrical energy into mechanical energy. Since the device can be either a generator or a motor, it is called a **Dynamo Electric Machine**.

See how it works:

Two hand-held devices have their wire leads connected to each other and then two people each hold one of the devices.

To see the dynamo electric effect of the devices, each person takes turns doing the following:

First, one person turns their device's crank handle, while the other person watches their device's crank handle start to turn. This device is now in a motor mode that can be attached to drive something else. The device being cranked is said to be in a generating mode.

Now swap tasks, i.e. the one turning watches, while the one watching turns their devices crank