

The Journey InsideSM: Circuits and Switches Student Handout: Using Electricity

Using Electricity

Look around the room. How many things in the room use electricity? How many things in your home use electricity? How many kitchen tools can you name that use electricity?

Many of these electrical devices use household current. Household current is 110- to 120-volt alternating current (AC)—current that rapidly alternates its direction in the wire. Other electrical devices use batteries. Batteries provide direct current (DC)—current that moves in only one direction. Batteries, because of their portability, are used to power many common devices such as radios, portable tape players, and remote controllers.



Some battery-powered devices such as portable radios or CD players can make use of household current by using an AC power adapter. An AC power adapter converts household current (AC) to the direct current (DC) needed by battery-powered devices. Electrical current in a household circuit behaves somewhat like water flowing in the pipes of your house. Getting water to the kitchen sink requires four things: a suitable amount of water, a pipe to carry the water, a pressure difference between the source of the water and the faucet on the sink, and a faucet to turn the water on and off. Electrical current is much the same. To get enough current to the kitchen toaster to make toast, you need to have a quantity of moving electrons, material to carry these electrons to the toaster, a pressure difference between the power station and the toaster, and a switch to turn the current on or off.

Activities

1. Stating that electricity flows through a wire much like water flows through a pipe is a simplification of a complex idea. This is an analogy often used to help beginners understand electricity. Identify one strength and one weakness of this analogy.
2. Make a list of some portable devices that operate on small batteries. What are some of the advantages and disadvantages of using batteries instead of household power?
3. A flashlight is a simple circuit that uses DC to produce a useful amount of light. Draw the parts of a flashlight. Label the conducting path, power source, switch, and electrical load in the flashlight.

Suppose the flashlight fails to light. Describe how you might find out which part is defective.