

# Lesson Notes: **FirstEnergy**

**Electric**  
**UNIVERSE**

## Understanding circuits

1.

Most of the electricity we use at home or school is produced by machines called generators. Generators create a large flow of electrons by passing coils of wire through a magnetic field. This is the electricity that operates lights, heaters, air conditioners, motors, or fans. We use this electricity by plugging appliances like computers or vacuum cleaners into electrical outlets.

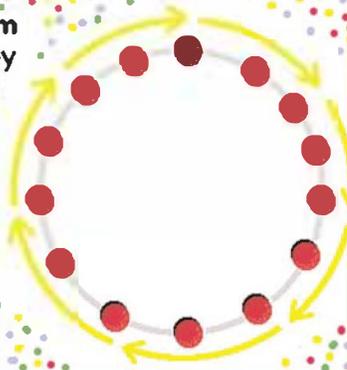
There is another important source of electricity. These are electric cells. We usually call them batteries. Electric cells, or batteries, produce small amounts of electricity through a chemical reaction.

2.

Most electric cells and batteries produce a small stream of electrons. They are generally safe to handle and are used for toys, flashlights, small calculators and things like that. You can safely use small batteries for experiments on electricity.



Either way, the stream of electrons works by going in a circle. This circle is an **ELECTRICAL CIRCUIT**.



3.

4.

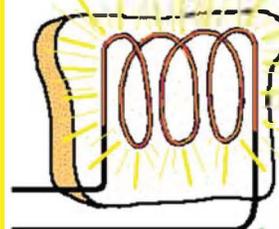
The stream of electrons must start at a source, like a battery or plug. They then flow through the appliance to perform useful work. Examples are a bulb (makes light), an oven (produces heat) or a motor (produces motion).

When an electrical appliance – like a toaster – is turned on, it makes a **CIRCUIT**. Electrons go in a circuit. An electron stream comes into the toaster from the plug, flows through the toaster, and goes back out the plug.



5.

The electrons cause a special kind of wire in the toaster to get hot and toast your bread.



6.

7.

You make a circuit by turning on a flashlight. Electricity from the battery travels through the light bulb. A tiny wire begins to glow and make light.

8.

If the flow of electrons is broken at any place on the circuit the appliance will stop working. For example, when the wire in a bulb burns through, the light goes off. Often, we want to stop the flow of electrons on purpose. Switches and fuses are often located in a circuit to turn it off.

When something like a switch stops the flow of electrons the circuit is said to be **broken**

When a switch is turned off, it will make a gap in the circle.

9.

10.

Most of the things that use electricity can be turned on and off. Here are some ways we can turn them on and off.

ON OFF Switch

Button OFF ON

Unplug

Remove Battery

## SCIENCE WORDS TO DISCUSS

\* **Generator • Magnetic field • Electric cells • Electrical circuit •  
• Electrons • Circuit • Broken circuit •**

## PRE & POST LESSON QUESTIONS

What are two sources for the electricity we use every day?

Which source produces large amounts of electricity?

How is this made?

What source produces small amounts of electricity?

How is this made?

What is the name for electricity flowing in a circle?

What happens when electricity stops flowing in a circle?

What is this called?

How many ways can you name that would stop electricity from flowing in a circle?

## LINKED EXPERIMENTS

Conductivity experiment