Electrical Circuits?

CIRCUIT SYMBOLS

WIRE (conductor)

LIGHTBULB

CLOSED SWITCH
OPEN SWITCH

BATTERY

SERIES CIRCUIT	PARALLEL CIRCUIT
Current has only one loop to flow through.	Contains two or more branches for current to flow through.
Examples include: flashlight, holiday lights	Examples include: Homes, automobiles

COMPLEX CIRCUIT

A circuit composed of both series and parallel circuits.

Electrical energy enters your home at the circuit breaker or fuse box and branches out to appliances, wall socket and lights.

Circuit breakers – small piece of metal that bends when it gets hot, opening circuit and stopping current flow.

Electronic fuse - small piece of metal that melts if current becomes too high, opening circuit

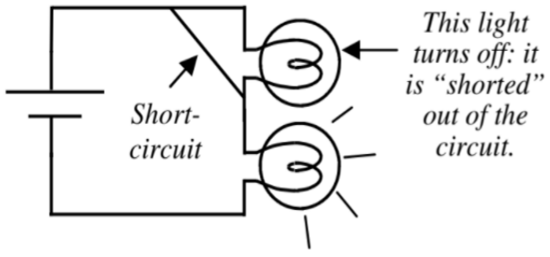
Short Circuit

A short-circuit (also called a “short”) is a wire that bypasses a device in a circuit.

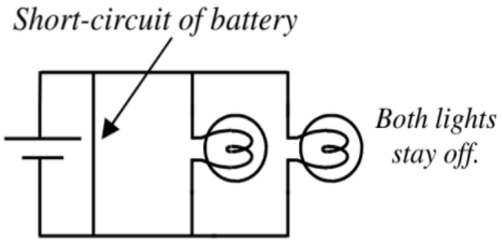
Electricity always chooses the path of least resistance.

Since wires have virtually no resistance, electricity will go through a wire instead of a device.

This is known as a short-circuit.



When a device is short-circuited the current by-passes it. It is easier for the current to go thru the wire than the resistor.



Short-circuiting a battery drains the battery and can be dangerous. Wires could overheat, melting the insulation, and even cause a fire.

Circuits

An electric circuit is something that provides a path through which electricity travels.

B. Although we think of circuits in terms of man-made items, circuits are in nature as well. For example, the nerves in your body create electric circuits!

C. Electric circuits are similar to pipes and hoses for water. You can think of wires as pipes for electricity. The big difference is that you can't get the electricity to leave the wire. If you cut a water pipe, the water comes out. IF you cut a wire, the electricity immediately stops flowing. Electric current cannot flow except in complete circuits.

D. Circuits are made up of wires and electrical parts, such as batteries, light bulbs, motors, or switches.

E. Circuits must be complete for the circuit to work. This means that there must be an unbroken wire or combination of wires and electric devices - basically the electricity needs a complete path for a circuit to be complete.

Circuit Parts

A. Circuits can have many parts. To make circuit drawing easier, there are some common symbols used in drawings called circuit diagrams. These electrical symbols are quicker to draw and can be read by anyone familiar with electricity.

B. Wires, batteries, light bulbs, and switches are commonly used in electric diagrams.

C. Because a circuit needs a complete path for electricity to flow, a switch works by breaking or completing the circuit path. When the switch is on, the circuit path is complete. When the switch is off, the circuit path is broken.

D. In many circuit diagrams, any electrical device is shown as a resistor. A resistor is an electrical component that uses electricity, such as a light bulb.

Circuit Types

A. A circuit with a switch turned to the off position or a circuit with any break in it is called an open circuit. Electricity can't travel through an open circuit.

B. A closed circuit is when a switch is turned to the on position, there are no breaks in the wire and the electricity can travel easily through a closed circuit.

C. A common problem found in circuits is that an unintentional break occurs. When building circuits it is a good idea to trace your finger around the wires to tell if the circuit is open or closed. If there are any breaks, the circuit is open. If there is a complete loop, then the circuit is closed.

D. A short circuit is a circuit path with zero or very low resistance. You can create a short circuit by connecting two ends of a battery. Short circuits are extremely dangerous because they can cause huge amounts of current