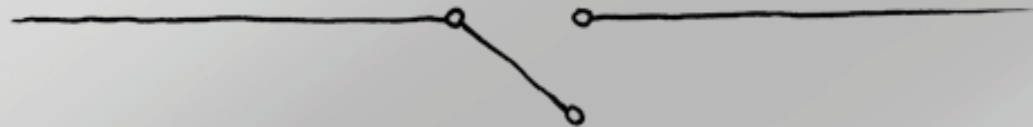


### WHAT'S A CIRCUIT?

An electric circuit is a pathway made of wires that electrons can flow through. It requires a source of power to give the force (voltage) that makes the electrons move. The three essential parts of any electrical circuit are: a power source (like a battery or generator), a load (like a light bulb or motor) and connectors (wires) to join them together.

REMEMBER! POWER is the ABILITY to do work, and ENERGY is a measurement of the work over time!



### MIND THE GAP!

A circuit needs to be closed for the electrons to flow in a complete loop.

Many circuits have a switch so that they can be turned on and off. When the switch is off, it makes a gap in the circuit and the electrons are not able to flow. When the switch is turned on, it closes the gap and the electricity is able to move and makes the device work. There are two types of circuits, series circuits and parallel circuits. The majority of circuits in your everyday life are parallel circuits.

### CIRCUITS

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There are two basic ways that circuits can be set up.

Series circuits are good for simple circuits such as flashlights or for circuits where you want all the loads to turn off and on together.

Parallel circuits are designed to allow loads to be switched on and off independently. Most circuits in your homes are parallel.



### SERIES CIRCUITS

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All loads are in a single row so electrons follow a single path through each one in turn. If you add more loads to the circuit (i.e. bulbs) the available power is shared by all loads. For each additional load (light bulbs, motors, buzzers, etc.) there is less power for each individual device so bulbs will dim. If a bulb is removed, the circuit is broken since the light bulb filament is actually part of the circuit. Therefore, all loads on the circuit stop working.

Christmas tree lights are a good example; when one light goes out the entire string stops working.

### PARALLEL CIRCUITS

A parallel circuit has more than one path for current flow. Any load on a separate path will be able to operate independently. Each separate pathway will have its own power supply that does not have to be shared. Bulbs will not dim, even when more are added as long as they each have their own path to the energy source. If you remove a light bulb from the circuit, current stops going down the path that's been broken, but there is still another path for the current to travel through. This means the second bulb will stay lit.

So if your Christmas lights used parallel circuits the rest of the lights would still be on if one burnt out.

