

Lesson 1: Introduction to circuits

Circuit – A complete pathway that allows electricity to travel from one end of a battery (i.e., a terminal) to the other end of a battery.

Current electricity – electrons (e-) flowing continuously through a circuit.

Electrical energy is measured in units called Joules (J)

The electrical energy in a circuit is provided by the electrons moving in the circuit. It is electrons that flow through electrical wires. Electrons are repelled from the negative terminal of a battery and attracted to the positive terminal.

Like this:

An electric cell converts chemical energy into electrical energy. Two or more cells combined together make a battery.

- If batteries are connected end-to-end (i.e., in series), the voltage adds.
- If connected in parallel the voltage does not change but the batteries last longer.

A primary cell – a cell that can't be recharged b/c the reaction is not reversible

A secondary cell – A rechargeable cell.

The load in a circuit is any device that converts electrical energy into another form of energy. E.g., A light bulb converts electricity into heat and light energy.

Schematic drawings – use simple symbols to depict an electrical circuit. (Hand out symbols page)

Part of circuit	Symbol
electric cell	
two-cell battery	
switch	
light bulb (lamp)	
ammeter	
voltmeter	
resistor	

Series Circuit – there is only one pathway for e-

Parallel Circuit – there are two or more pathways available for e-'s to move through.

Practice problems with schematic diagrams

1. Draw 3 light bulbs in series with a battery made from 2 cells in series.

Advantage – this circuit is very simple.

Disadvantage – if one light burns out, all the lights go out.

2. Draw a battery with 3 cells in series and 2 lights in parallel.

Advantage – if one light burns out, the other will remain on

Disadvantage – the circuit is more complex.

3. Draw a flashlight with two cells in series:

4. Draw two cells in parallel with a light:

Draw two groups of two cells in series such that each series group is placed in parallel with each other.
Also include two lights arranged in parallel with a switch that controls only one of the lights.