ELECTRICITY

The Basics

Ohm's Law – I = V/R

I – current (amperes/amps)

V – voltage (volts)

R – resistance (ohms)

Voltage: a force that pushes the current through the circuit

Resistance: friction that impedes flow of current through the circuit

Current: the actual "substance" that is flowing through the wires of the circuit (electrons)

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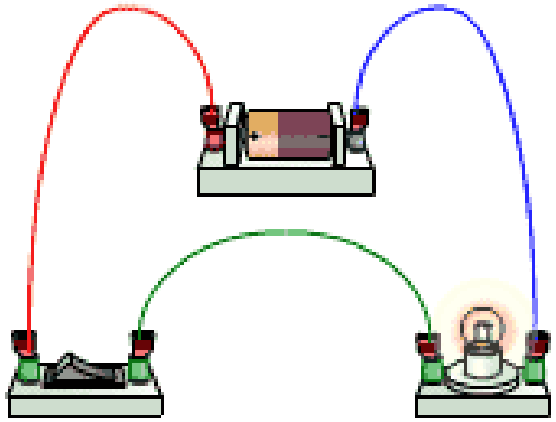
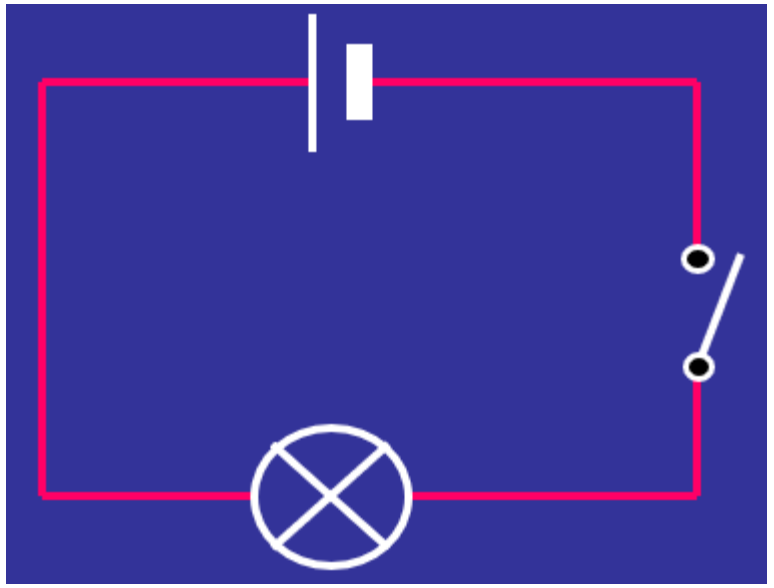
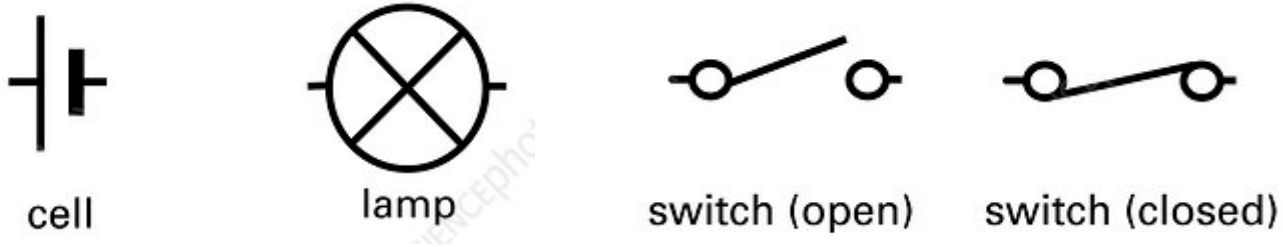
Circuit Diagram

Scientists usually draw electric circuits using symbols:







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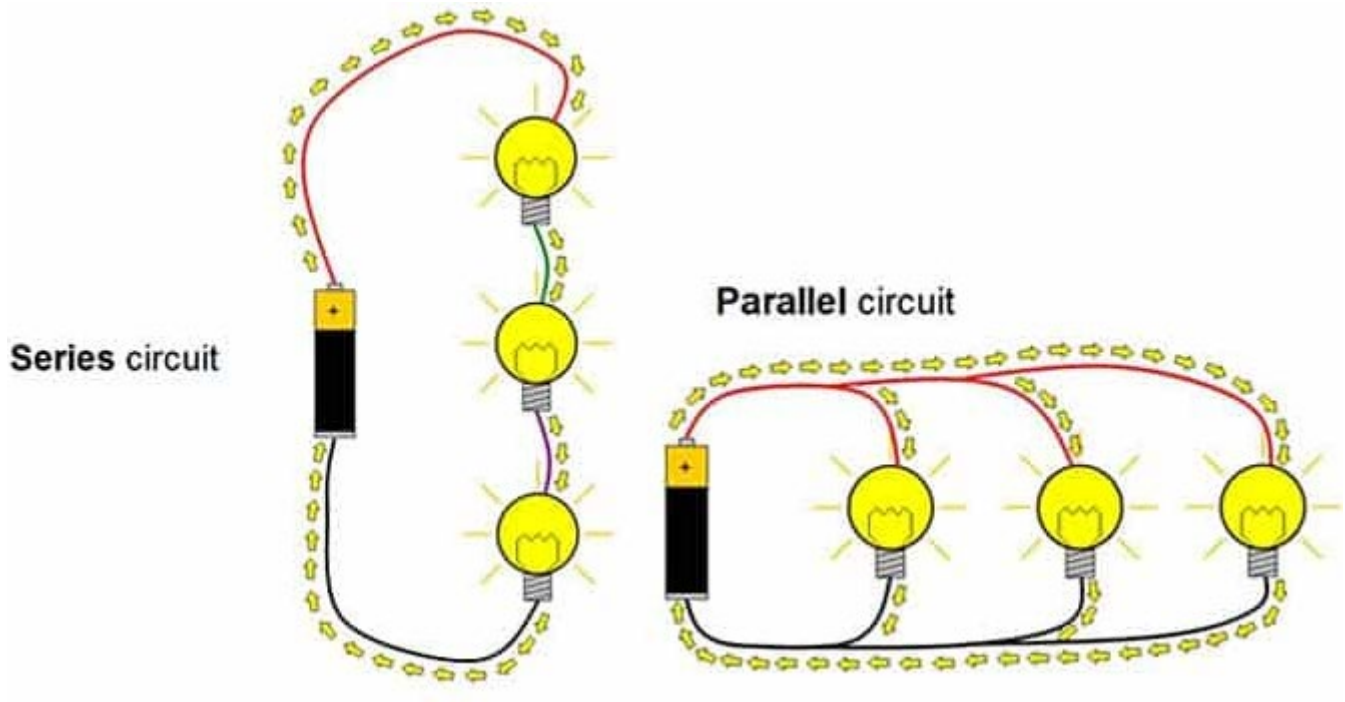
Simple Circuits

- Series circuit
  - All in a row
  - 1 path for electricity
  - 1 light goes out and the circuit is broken
  - Voltage is shared between the components
- Parallel circuit
  - Many paths for electricity
  - 1 light goes out and the others stay on
  - Voltage is the same in all parts of the circuit (for all components)



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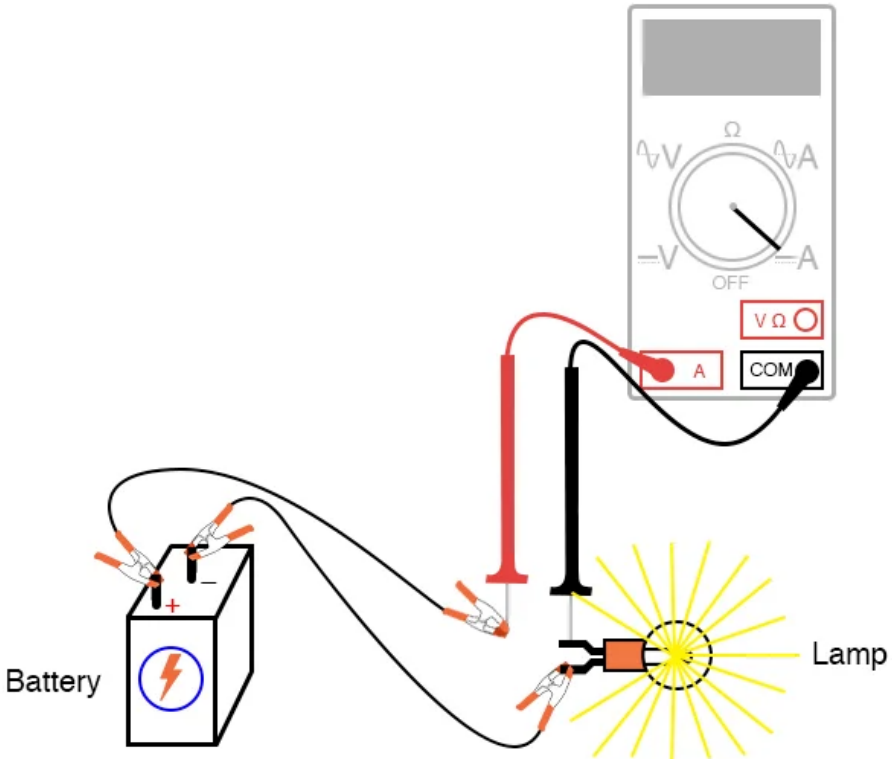
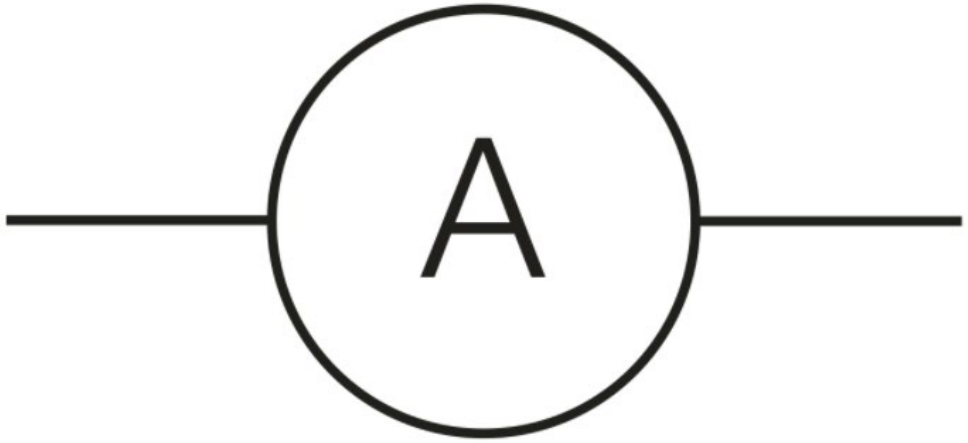
Measuring Current

Electric current is measured in amps (A) using an ammeter connected in series in the circuit.





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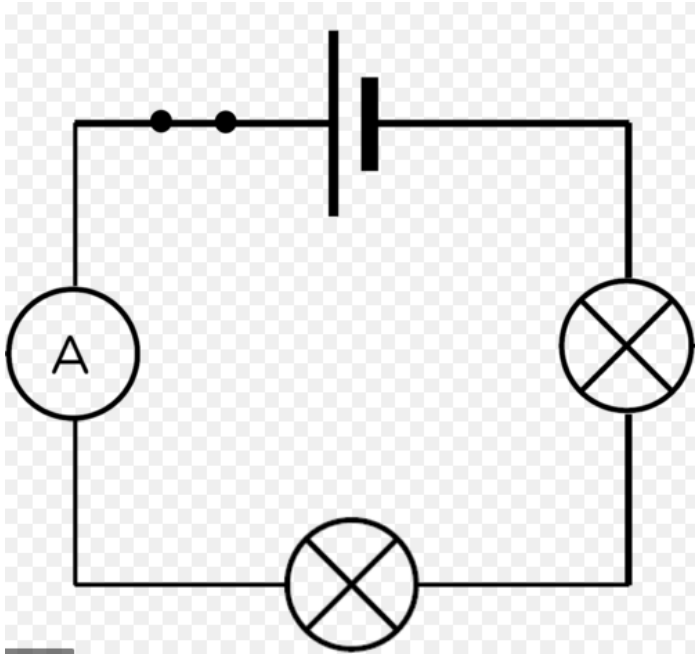
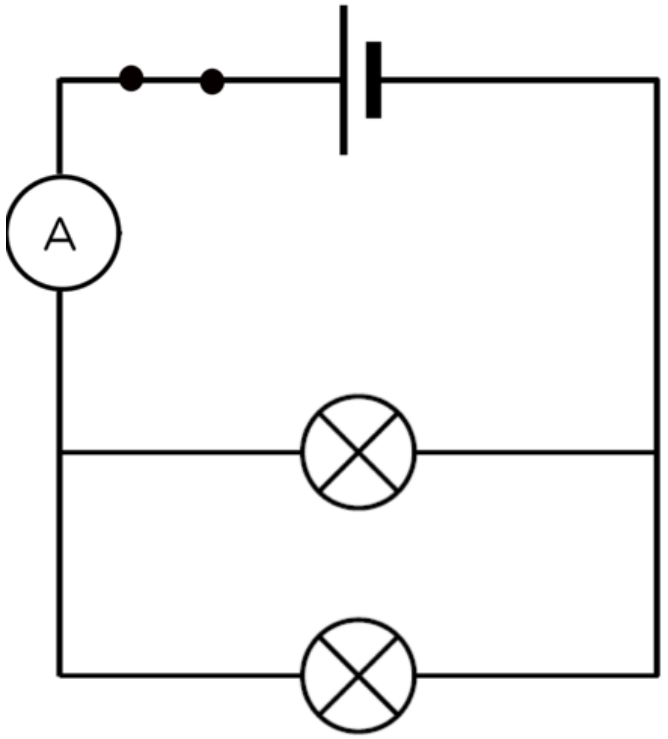
An Ammeter in a Circuit



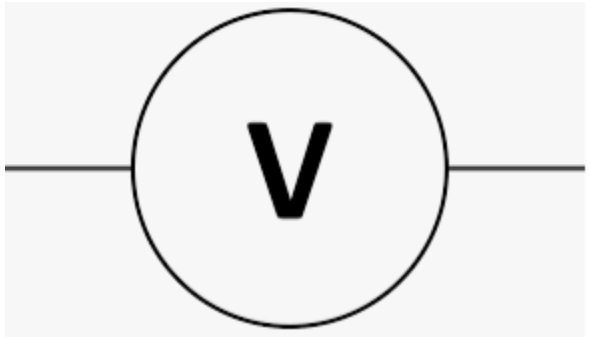
Series Circuit



Parallel Circuit

Measuring Voltage

The ‘electrical push’ which the cell gives to the current is called the voltage. It is measured in volts (V) on a voltmeter.



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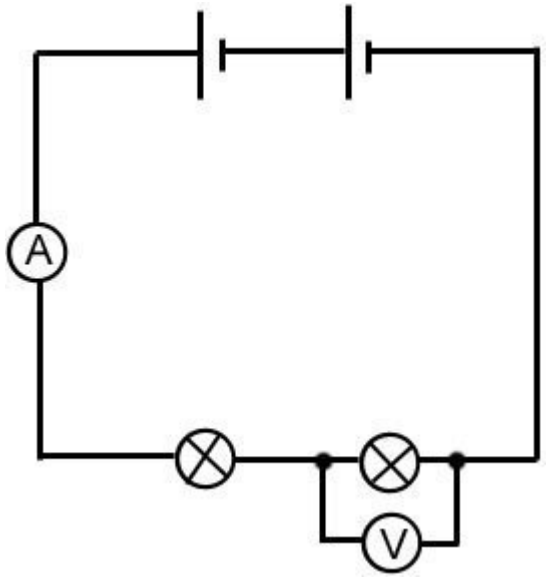
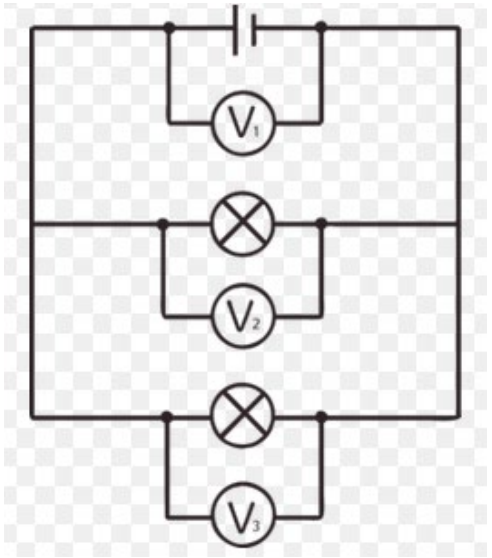
Measuring Voltage

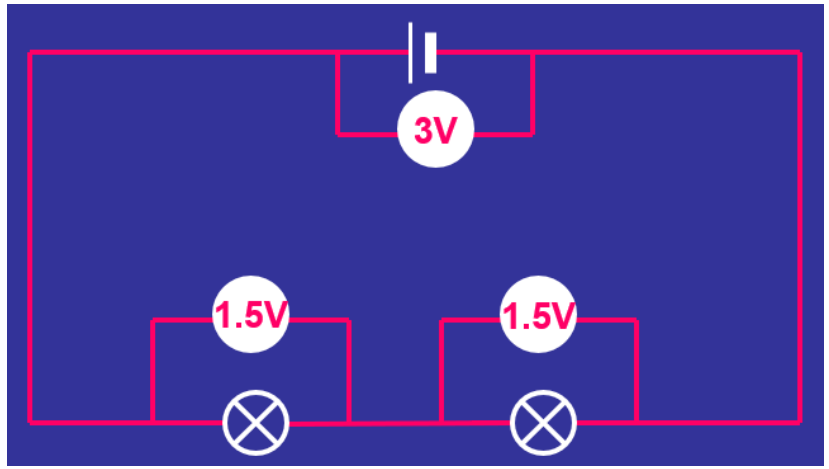
This is how to draw a voltmeter in a circuit.



Series Circuit



Parallel Circuit



Series Circuit (voltage shared)

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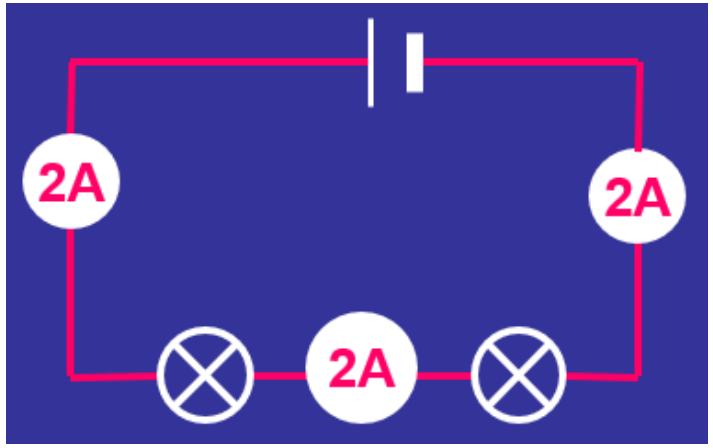
Measuring Current

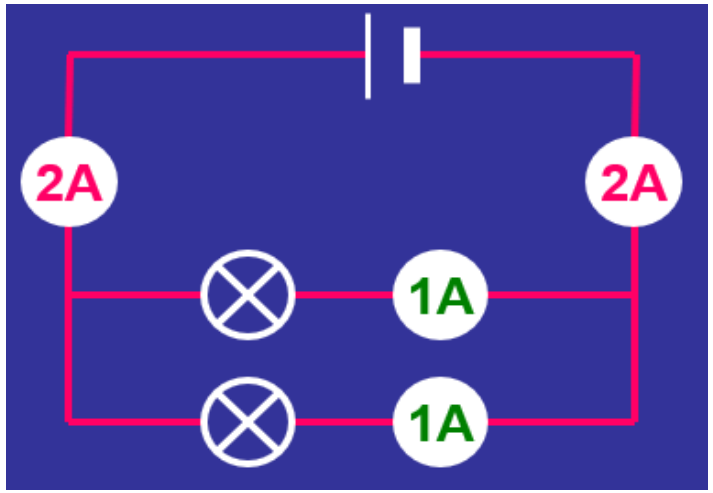
Series Circuit

Current is the same at all points in the circuit.



Parallel Circuit

Current is shared between the components.



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Voltage, Current & Power

- One Volt is a Joule per Coulomb (J/C)
- One Amp of current is one Coulomb per second (6.24 x10^18 electrons/second).
- If I have one volt (J/C) and one amp (C/s), then multiplying gives Joules per second (J/s). I.e. Power: J/s = Watts
- The formula for electrical power is:
    - P (power) = V (voltage) x I (current)

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