

Current Electricity & Electrical Circuits

SECTION 11.2

SNC1D

Current Electricity

Recall: static electricity is the build-up of charge on the surface of an insulator.

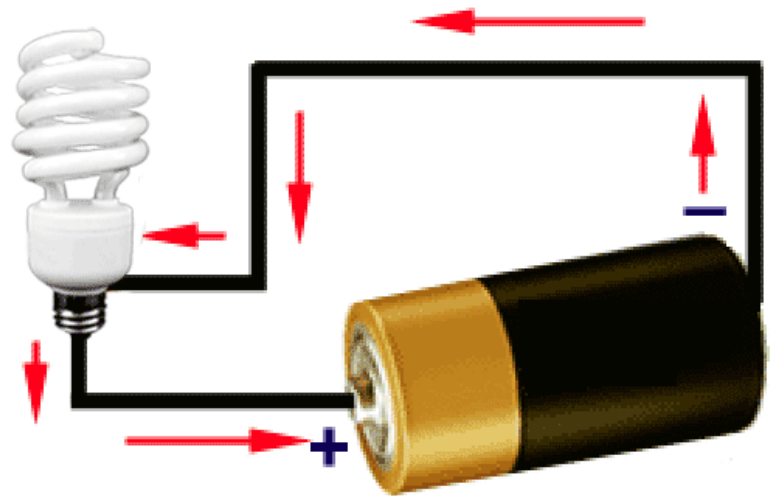
1. **Current electricity** is the continuous flow of electrons through a conductor.

This is the type of electricity we use to power our electrical devices.

2. Two basic requirements for current electricity:

- a) A closed path (“circuit”), made of a conductor
 - e.g., a wire

- b) A voltage source
 - e.g., a battery or generator

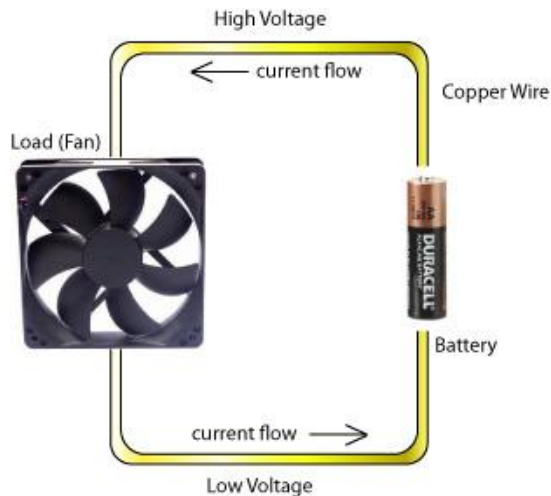


Simple circuit with light

3. The flow of electrons in an electrical circuit is often compared to the flow of water.

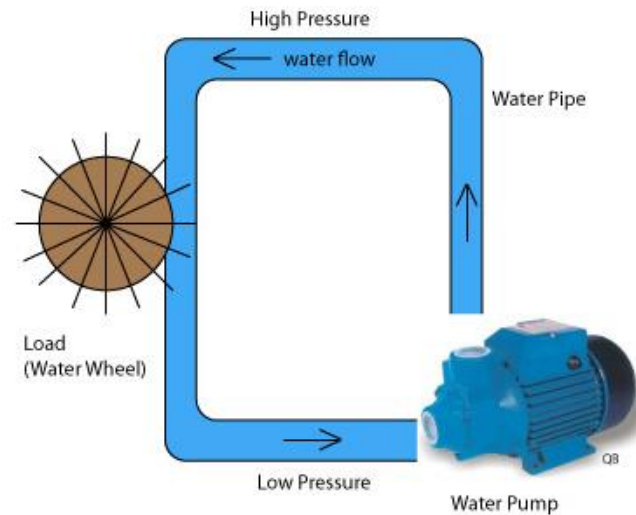
ELECTRICAL CIRCUIT

- ELECTRONS IN A CIRCUIT EXPERIENCE A PRESSURE (**VOLTAGE**) THAT PUSHES THEM THROUGH THE CIRCUIT.



WATER CIRCUIT

- WATER PUMPED TO A HEIGHT WILL EXERT A PRESSURE THAT MOVES IT THROUGH THE CIRCUIT.



Features of a Circuit

4. Electrons must have a closed circuit in order to flow.

When the tungsten filament of a light bulb burns out, it physically breaks. This breaks the circuit, stopping the flow of electricity.



5. Common electrical circuits may also contain:

a switch -

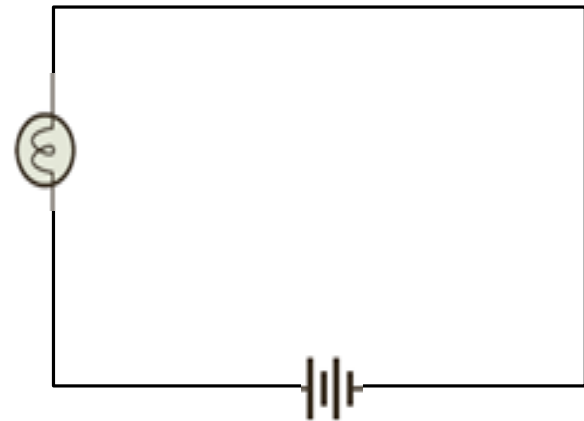
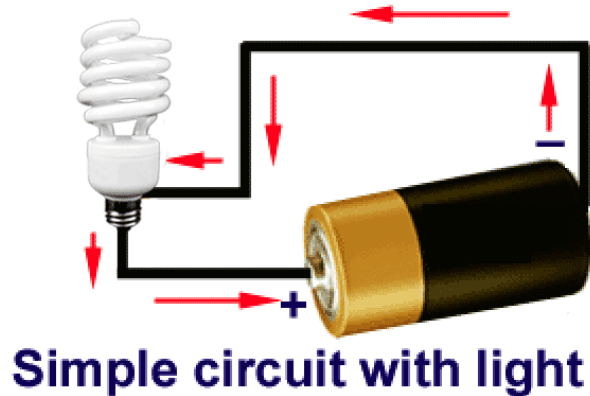
a resistor –

a load -


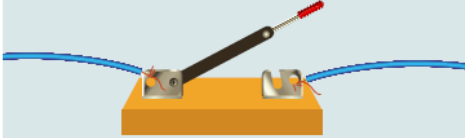


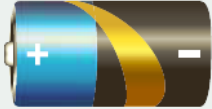






Circuit diagrams

6. A circuit diagram represents a circuit and all of its components, using symbols.



Copy the circuit symbols into your chart

Symbol	Circuit Component
connecting wire	
switch	
resistor or load	
battery	
cell	

Symbol	Circuit Component
bulb	
voltmeter	
ammeter	
AC source	

Practice!



- a) Draw a simple circuit diagram with: battery, light bulb, switch (open) and connecting wires

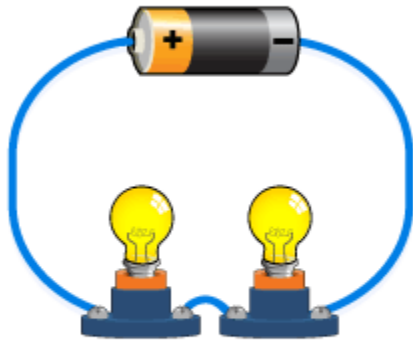
- b) Draw a simple circuit diagram with: battery, light bulb, switch (closed) and connecting wires

- c) Current needs a closed path in order to flow. Which one of these circuits will permit electricity to flow?

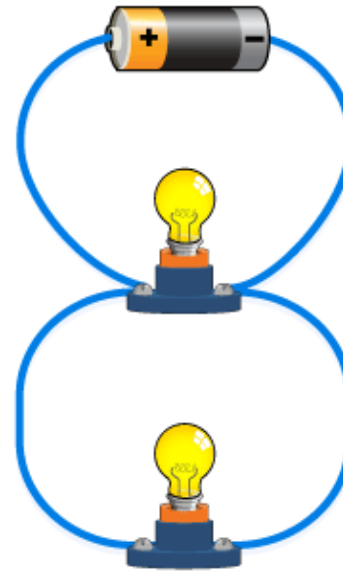
Types of Circuit

There are two types of circuit:

- a. **Series circuit** – Electrons can only travel through one path
- b. **Parallel circuit** – Electrons can travel through more than one path



series



parallel

Electrical Current

Electrical current is defined as the amount of charge that passes through a point every second:

$$\text{current} = \frac{\text{charge}}{\text{time}}$$

Quantity	Unit of measure
charge	coulomb (C)
time	second (s)
current	ampere (A)

Fun Fact:

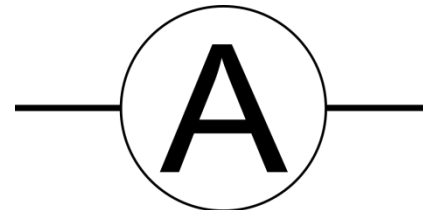
One coulomb = Charge of 6.25×10^{18} electrons!!

$$\text{current} = \frac{\text{charge}}{\text{time}}$$

The unit of current is the **ampere (A)**.

- A current of 1.0 A in a circuit means that 1.0 C of charge passes a given point in the circuit every second.

Current is measured using a device called an **ammeter**.



Homework

Read pg. 446-450

Pg. 454 #1, 4a, 5, 6, 7