



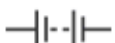














Y8 Term 3 Physics – Electricity (Summary sheet)

Circuit components and symbols

Circuits are made up of different **components** which have different **functions** (jobs). Electrical circuits are often represented by **circuit diagrams**. They are simple and easy to interpret by using **symbols** for each component.

Component	Picture	Symbol	Function
Wire		—	Connects components in a circuit. Made of metal (as metals are good conductors)
Cell			Transfers energy to the electrons and pushes them through the wires to create an electrical current
Battery			2 or more cells connected.
Bulb			Transfers energy away from the circuit by light and heating
Switch			Can be used to break and complete circuits
Ammeter			A device that measures the current in a circuit. Must be connected in series.
Voltmeter			A device that measures how much energy is being transferred by a current. Must be connected across components in parallel.
Resistor			A component that makes it difficult to the electricity to flow – resistors are used to reduce the size of the current in a circuit.
Variable Resistor			Used to reduce the current flow in a circuit. Its resistance can be changed.

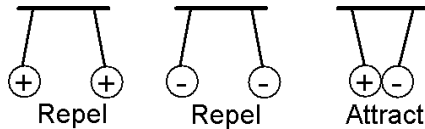
Current	Flow of electrons through a circuit, measured in Amps
Conductor	A material in which a current can flow easily. e.g. Metals
Insulator	A material in which a current cannot flow easily. e.g. plastic or wood

Static Electricity

Materials are made up of atoms. Atoms contain positive and negative charges. Materials are not usually electrically charged because their atoms contain the same amount of positive and negative charge.

Rubbing two **insulating** materials together may result in them becoming charged. During rubbing, **negatively charged electrons** are rubbed off one material and onto another due to the **friction** between the surfaces.

- The material that **gains electrons** becomes **negatively charged**
- The material that **loses electrons** is left with a **positive charge**



Materials that have the same charge will **repel**.

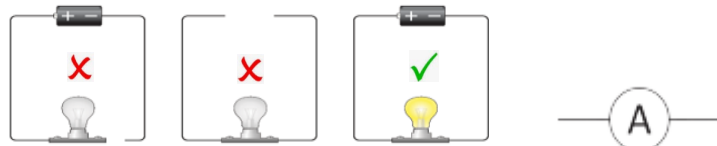
Materials that have opposite charges will **attract**.

Current Electricity

Energy can be transferred from one store to another by an electrical **current**. Electrical current is the flow of **electrons** through a circuit.

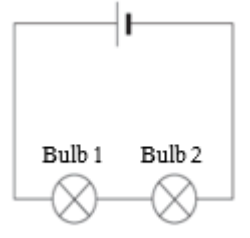
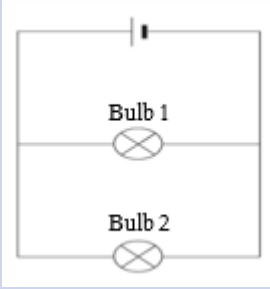

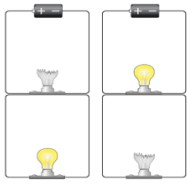
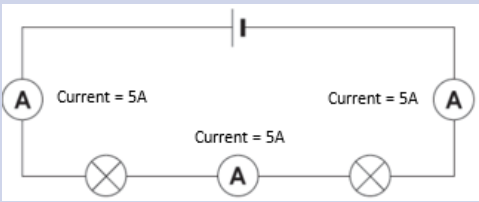
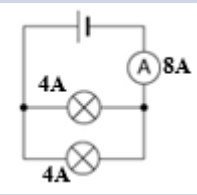
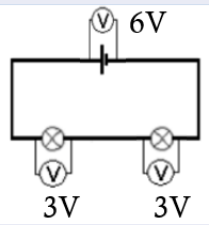
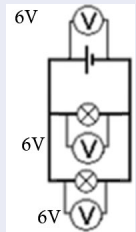
For an electric current to flow you need two things:

- Something to provide the energy such as a **cell** or a power supply.
- A path for the current to flow in with no gaps. This is called a **complete circuit**.



Current is measured using an **ammeter**.

Y8 Term 3 Physics – Electricity (Summary sheet 2)

	Series Circuit	Parallel Circuit
<p>What is it?</p>	<p>All the components are joined in one loop. There is only one path for the current.</p> 	<p>There is more than one path for the current.</p> 
<p>What happens if there is a gap in the circuit? (By opening a switch or a bulb breaking)</p>	<p>No current will flow as there is not a complete circuit.</p> 	<p>There may still be a complete circuit for the current to flow, as there is more than one path to take.</p> 
<p>What happens to the <u>current</u> at different points in the circuit?</p>	<p>The current is the same everywhere!</p> 	<p>The current splits at each branch.</p> 
<p>What happens to the <u>voltage</u> at different points in the circuit?</p>	<p>The voltage is shared between each of the components</p> 	<p>The voltage is the same across each component in parallel.</p> 

Voltage

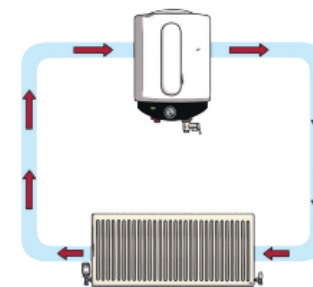
Voltage is the **energy per charge** that is transferred to, or from, an electrical charge when it moves through a component.

The voltage from the cell can be thought of as providing the “**push**” the electrons need to transfer energy through the circuit.

The **unit** for voltage is **volts**, usually written as “**V**”. Voltage is measured using a **voltmeter**, which must be connected in parallel across the component it is measuring.

Electrical Models

Scientists often used **models** to help them explain difficult ideas. Some models are better than others. In the boiler and radiator model, the pump pushes the water around the system. It does a similar job to a **battery** pushing the **charges** around the system, like the charges flowing through wires in a circuit. The radiator is similar to a bulb because it transfers **energy** supplied by the system to the surroundings.



Resistance

The resistance of a component is a measure of how difficult it is for an electrical current to flow through it.

It is measured in **ohms**.

All circuit components have a resistance, including wires. Thicker, shorter wires have a lower resistance than longer, thin wires.

When more bulbs are added to a **series circuit** the current decreases because the total resistance has increased.

