Year 10 Science – Term One KO

1. Tier 3 Vocab

- **Diode** A component that only allows current to flow in one direction
- **Electric current** The flow of charge, measured in amps (A)
- **Light-dependent resistor (LDR)** A component whose resistor changes depending on the light intensity
- **Light-emitting diode (LED)** A type of diode that also emits light
- **Non-ohmic conductor** A conductor that obeys Ohm's law
- **Ohm's law** The potential difference across a conductor is directly proportional to the current through the conductor (as long as temperature remains constant)
- **Ohmic conductor** A conductor that does not obey Ohm's law
- **Potential difference** (also called voltage) The amount of energy transferred per unit of charge, measure in volts (V)
- **Resistance** The opposition to current in a circuit, measure in ohms (Ω)
- **Thermistor** A component whose resistance changes depending on the temperature

2. Electric charge and current

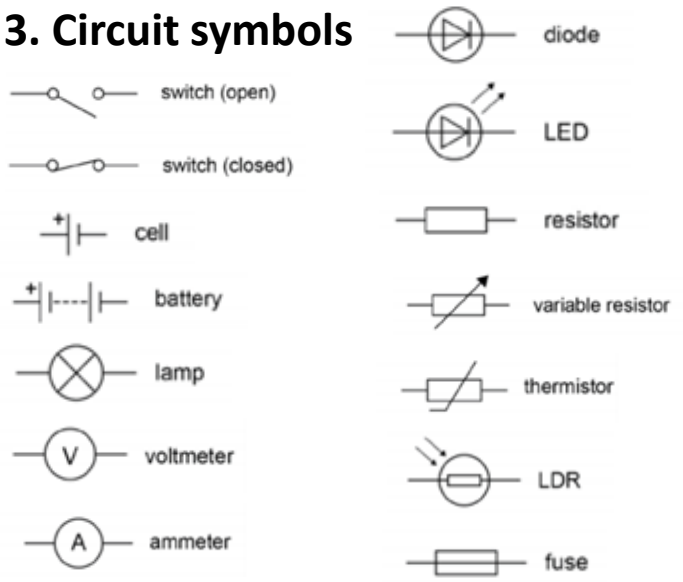
- An **electric current** is defined as the flow of charged particles.
- Usually these charged particles are **electrons** (which have a **negative** charge of -1).
- Metals are good conductors of electricity because they have **delocalised** electrons that are free to move.
- The size of the current depends on the amount of charge that is flowing and the time it takes to flow:

$$Q = It$$

Q is charge flow in coulombs (C); I is current in amps (A); t is time in seconds (s)

- Current in a circuit is measured with an **ammeter** placed in **series**. Current does **not** get used up.

3. Circuit symbols



4. Potential difference (pd)

- **Potential difference** (also called or voltage) is a measure of the amount of energy transferred by each unit of charge – the higher the pd, the more energy is transferred.
- The total energy transferred can be calculated:

$$E = QV$$

E is energy transferred in joules (J); Q is charge flow in coulombs (C); V is potential difference in volts (V)

- Potential difference of a component is measured by placing a **voltmeter** in **parallel**.
- In a series circuit the total pd of the components always adds up to the pd of the battery.
- In parallel circuits each branch has the same total pd as the battery.

5. Resistance

- **Resistance** is the opposition to current in a circuit. The higher the resistance, the lower the current.
- Resistance is measured in ohms (Ω).
- Ohm's law states that potential difference is directly proportional to current (as long as temperature remains constant).
- Resistance is therefore related to pd and current:

$$V = IR$$

V is potential difference in volts (V); I is current in amps (A); R is resistance in ohms (Ω)

- Total resistance in **series**: **add** resistors together.
- Total resistance in **parallel**: always **less than** the **lowest** individual resistor.

6. Command Words

These are the key words in a question that tell you how the question should be answered.

Write – requires you to recall a key fact without any further information needed.

Example:
Write the definition of electric current.
Answer: Electric current is the flow of charge.

Describe – say what will happen, but without any reason why.

Example:
Describe what happens to the resistance of a thermistor as temperature increases.
Answer: The resistance will decrease as temperature increases.

Explain – give the reasons for something happening; include "because" or "so".

Example:
A circuit contains a lamp and a diode. The lamp lights normally. The diode is then reversed. Explain what happens to the lamp.
Answer: The lamp no longer lights up *because* the diode does not allow current to pass in the reverse direction.