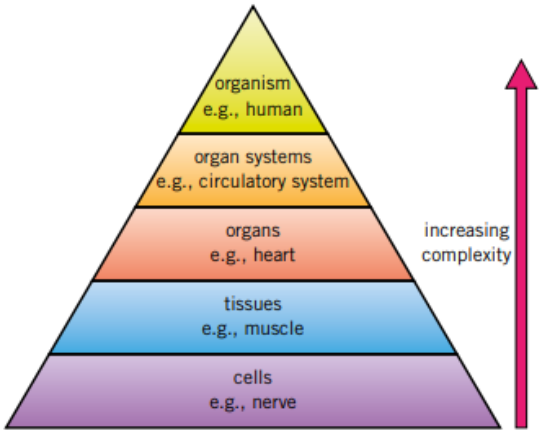
Science – Organisms

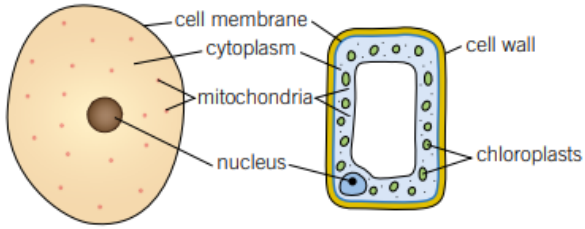
Levels of Organisation



Plant and Animal Cells

To be able to **observe** a **cell** we need to use a **microscope**, this magnifies the cell to a point to which we can see it

Plant and animal cells have small structures inside known as **organelles**, each of these performs a certain role which allows the cell to survive

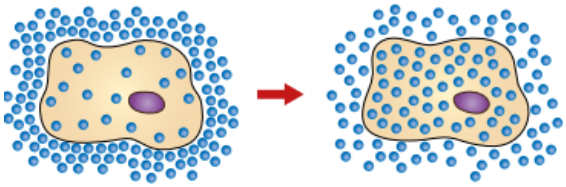


Movement Into and Out of Cells

The process in which substances move into and out of cells is known as **diffusion**

This occurs across the **cell membrane**

During diffusion particles move from an area of high **concentration**, to an area of low concentration

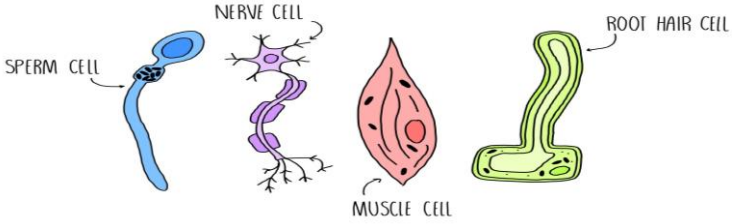


Oxygen and nutrients enter the cell by diffusion, carbon dioxide and waste products leave

Specialised Cells

Specialised cells are designed to carry out a particular function, because of this they have specific features and adaptations to allow them to carry this out

Both plant and animal cells can be specialised, with these specialised cells working together to help the organism to survive



Muscles

Muscles are a type of tissue which allows movement

They pull on tendons which in turn pull on bones to allow movement

Muscles like the triceps and biceps are known as **antagonistic muscle pairs**, they work together –as one contracts, the other will relax

The Skeleton

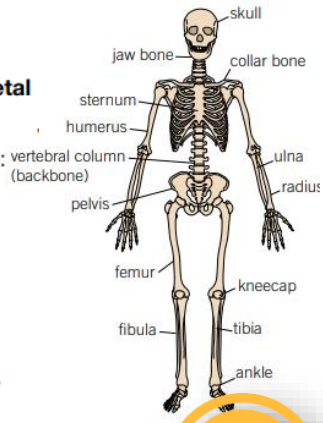
The **skeleton** is made up of 206 **bones** which are a type of **tissue**

Bones have a blood supply and are a living tissue

The skeleton is part of the **muscular-skeletal system**

The four main functions of the skeleton are:

- To support the body – to keep you upright and hold **organs** in place
- Protect organs – such as the skull protecting the brain
- Movement – by working with muscles to allow you to move
- Making blood cells – the **bone marrow** produces red and white blood cells



LITERACY

Key words and Vocabulary

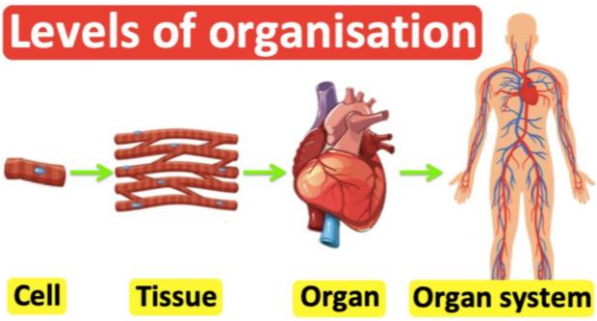
Antagonistic muscle pair, bone, bone marrow, cartilage, cell, concentration, diffusion, joints, ligaments, microscope, muscular-skeletal system, nucleus, organ, organism, organ system, skeleton, specialised cells, tendons, tissue

Organs

An organ is a group of tissues that have the same function

They can work with other organs in an **organ system**, such as the respiratory system which uses organs like the heart and lungs to transfer oxygen around the body

Vital organs are the organs that need to keep functioning for an **organism** to stay alive, e.g. the heart



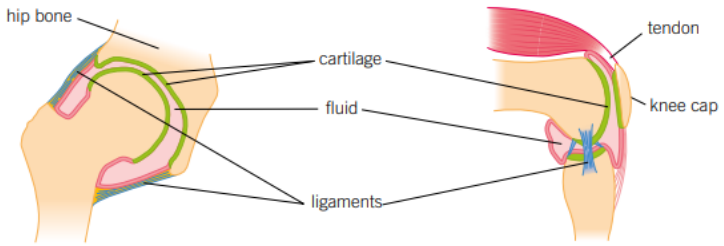
Movement

Joints occur between bones and allow movement, there are three main types of joints

Hinge	Ball and socket	Fixed
For back and forward movement, e.g. knees	*For movement in all directionse.g. hips*	*Do not allow movement, e.g. skull*

Joints have three main types of tissue:

Ligaments	**Cartilage**	**Tendons**
Connect bone to bone	*Coats the end of bones as a protection*	*Connects bone to muscle*



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LITERACY

Science – Electricity

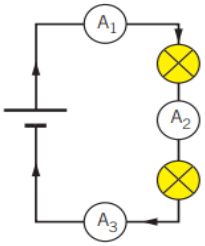
Current

Current is the amount of **charge** flowing per second

The charges that flow in a circuit are **electrons**, they are negatively charged

Electrons leave the negative end of the **cell** and travel around the circuit to the positive end of the cell

Current has the unit of Amps (A) and is measured with an **ammeter** (which is placed in series or in the main circuit)

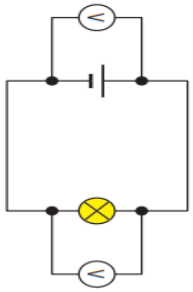


Potential Difference

Potential difference is the amount of energy transferred by the cell or **battery** to the charges

The value of potential difference tells us about the force applied to each charge and then the energy transferred by each charge to the component which it passes through

Potential difference has the unit of volts (V) and is measured with a **voltmeter** (which is placed in parallel to the circuit)



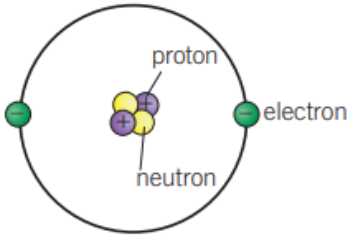
The Atom

The **atom** consists of a central nucleus with electrons orbiting around the outside in shells

Electrons have a negative charged

Protons are inside the nucleus and have a positive charge

Neutrons are inside the nucleus and have a neutral charge



Series Circuits

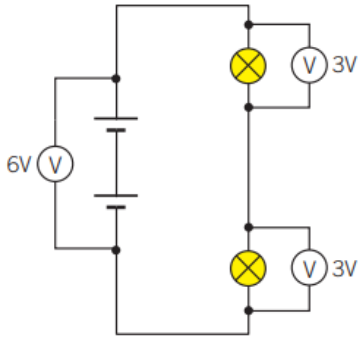
Series circuits only have one loop

If one component breaks, the whole circuit stops working

Current is the same everywhere in a series circuit

The total potential difference from the battery is shared between the components in a series circuit

Adding more bulbs decreases the brightness of the bulbs



Resistance

Resistance is a measure of how easy or how hard it is for charges to pass through a component in a circuit, measured in ohms (Ω). Resistance is calculate using the following equation:

$$\text{resistance } (\Omega) = \frac{\text{potential difference (V)}}{\text{current (A)}}$$

Materials with a high resistance are said to be **insulators**

Materials with a low resistance are said to be **conductors**

Parallel Circuits

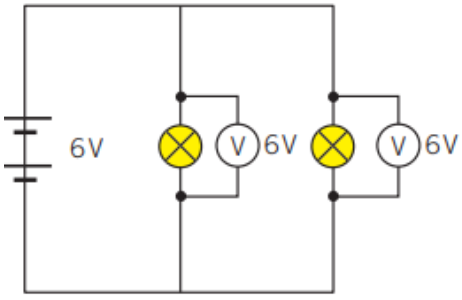
Parallel circuits have more than one loop

If one component breaks, the rest of the circuit will still work

Current is shared between the different loops in the circuit

The potential difference is the same everywhere in the circuit

Adding more bulbs does not affect the brightness of the bulbs



Static Electricity

Static electricity is the caused by the rubbing together of two **insulators**

This causes electrons to be transferred, leaving one object with a positive charge, and one object with a negative charge

Like charges will **repel**, opposite charges will **attract**