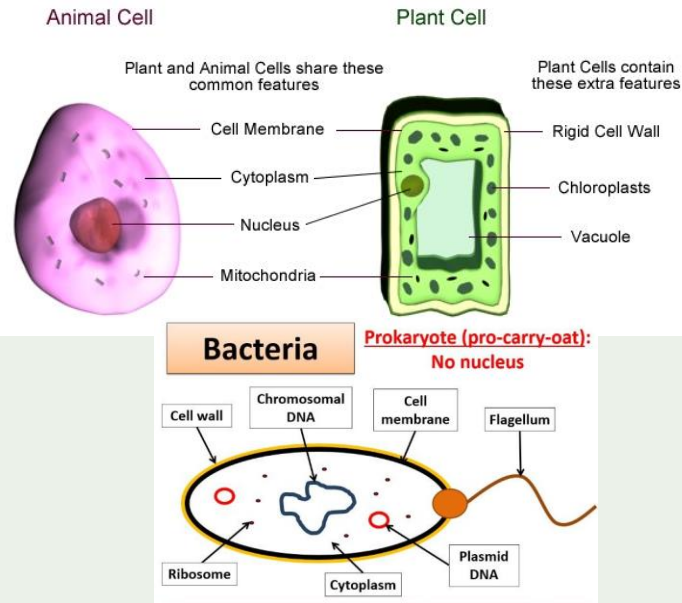


Cells

Key words

Organism	A living thing.
Cell	The building block of living organisms.
Microscope	An optical instrument used to magnify objects, so small details can be seen.
Cell membrane	Surrounds the cell and controls what substances can move into and out of the cell.
Cytoplasm	A 'jelly like' substance found in cells where all the chemical reactions of the cell take place.
Nucleus	Controls the activities of the cell and contains the genetic material (DNA).
Mitochondrion	The cell organelle where energy from glucose is released during a chemical reaction called respiration.
Ribosome	Where proteins are made.
Chloroplast	The plant cell organelle where photosynthesis takes place.
Vacuole	The plant cell component that contains cell sap and helps to keep the cell firm.
Cell wall	The plant cell component that surrounds the cell giving it strength. Made from cellulose.
Specialised cell	A cell with a special shape and structure which enable it to perform a particular function.
Diffusion	The movement of particles of a liquid or gas from an area of high concentration to an area of low concentration.
Unicellular organism	An organism consisting of only one cell.
Multicellular organism	An organism made of many cells.
Organelle	A component of a cell with a particular function
Prokaryote	A type of cell that does not have a nucleus. Bacteria cells are prokaryote cells.
Plasmid DNA	A small circular ring of DNA found in prokaryote cells.
DNA	A chemical that is the instructions for how an organism grows, reproduces and functions
Flagella	A tail like structure used for movement

Key diagram



Key knowledge

Key components of an animal cell are the nucleus, cytoplasm, cell membrane and mitochondria.

Key components of a plant cell are the nucleus, cytoplasm, cell membrane and mitochondria. In addition to these plant cells also have a cell wall, vacuole and chloroplasts.

Bacterial cells are a type of cell known as a prokaryote cell.

Key components of a prokaryote cells are the cell wall, cell membrane, cytoplasm DNA, plasmid DNA and flagella.

Respiration takes place in the mitochondria. Respiration releases energy which can be used for other processes in the organism.

Photosynthesis takes place in the chloroplasts. Photosynthesis requires energy which the plant gets from sunlight.

Some examples of specialised cells are: Nerve cells, Red Blood cells, Sperm and Egg cells, Leaf cells and Root Hair cells. You should know how these cells are specially adapted to their jobs.

Structural adaptations are special features that allow a cell to do its job.

Substances such as glucose (needed for the plant to make energy) and carbon dioxide (waste product from respiration) need to move in and out of cells.

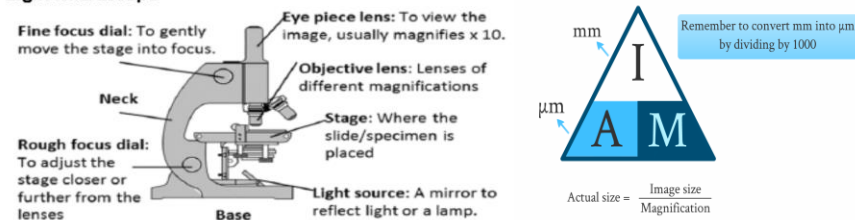
Some substances can move in and out of cells by diffusion e.g. oxygen and carbon dioxide.

Water diffuses from the soil into the root hair cells of plants. It is then carried through the plant to all the cells to stop the plant from wilting.

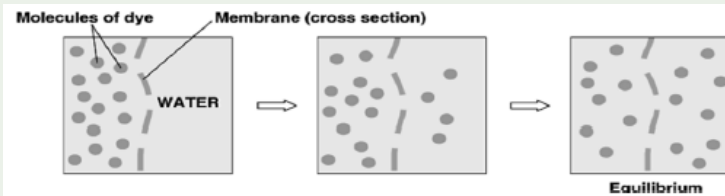
The **amoeba** and **euglena** are examples of a unicellular organisms.

Practical –observe cells using a light microscope



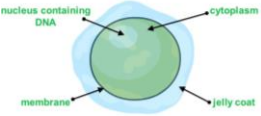

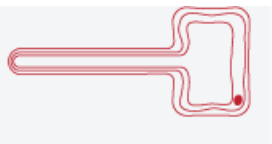

Light Microscope



Key process – diffusion



Cells

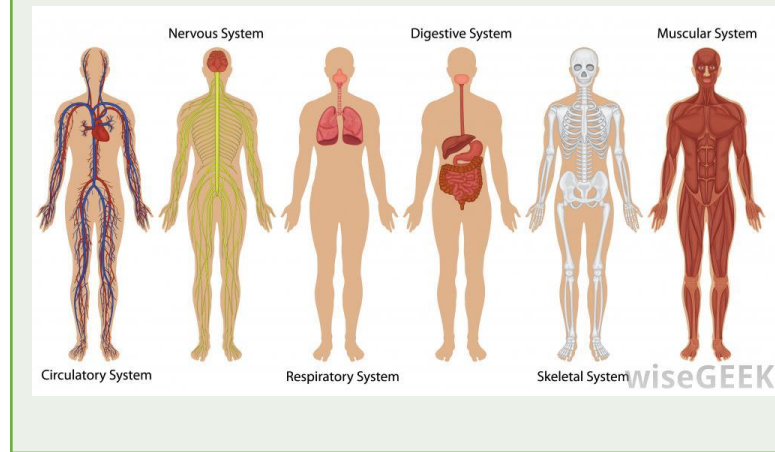
Image	Function and adaptations
	<p>Nerve cells transmit electrical signals. They are well suited to their function because:</p> <ul style="list-style-type: none"> • They are thin, and can be more than 1 metre long. This means they can carry messages up and down the body over large distances. • Nerve cells have branched connections at each end. These join to other nerve cells, allowing them to pass messages around the body. • They have a fatty (myelin) sheath that surrounds them. The fatty sheath increases the speed at which the message can travel.
	<p>Red blood cells carry oxygen around the body. They are well suited to this function because:</p> <ul style="list-style-type: none"> • They contain haemoglobin, which carries oxygen molecules. • They don't have a nucleus, allowing more space to carry oxygen. • They are a flat disc shape (bi-concave) which gives them a large surface area, and the best chance of absorbing as much oxygen as they can.
	<p>The eggs function is to carry genetic material and to take part in fertilisation with the sperm cell. They are well suited to this function because:</p> <ul style="list-style-type: none"> • They are large to contain a large food store (yolk) for the developing embryo, • Surrounded by chemicals to allow only one sperm to fertilise it.
	<p>The sperms cell function is to fertilise the ovum (female egg cell). They are well suited to this function because:</p> <ul style="list-style-type: none"> • The tail of the sperm cell enables it to swim to the ovum and fertilise it. • The head is streamlined also to aid swimming • The head contains genetic information and a nucleus and has an enzyme to help penetrate the egg cell membrane to allow fertilisation. • The middle section immediately behind the head is packed with mitochondria to provide energy.
	<p>Root hair cell function is to absorb water and minerals from soil water. They are well suited to this function because:</p> <ul style="list-style-type: none"> • Has a long, thin extension called the root hair, which increases surface area for absorption to happen.
	<p>Palisade cells are where photosynthesis occurs. They are well suited to this function because:</p> <ul style="list-style-type: none"> • Packed with chloroplasts which contain the light absorbing pigment chlorophyll.

Cells

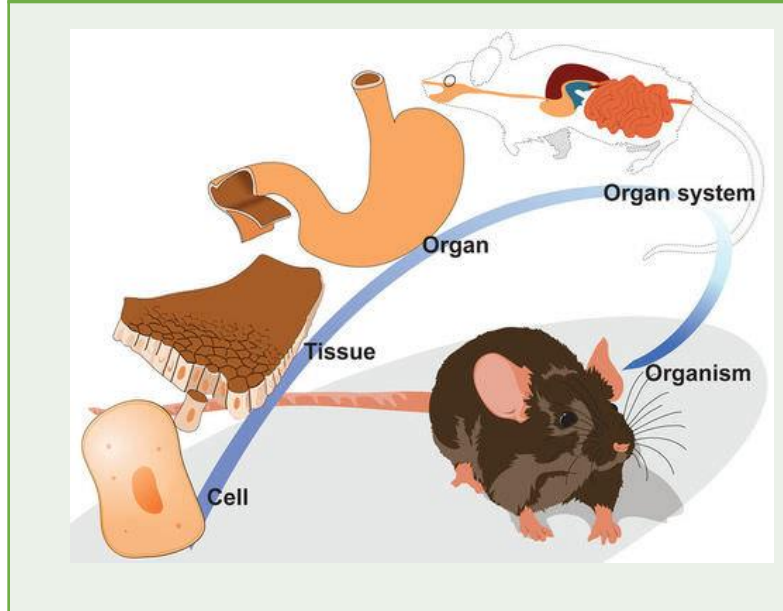
Key words

Tissue	A group of similar cells working together to perform a function.
Organ	A group of tissues working together to perform a function.
Organ System	A group of organs working together to perform a function.
Organism	An individual animal, plant or single celled life form.
Circulatory system	The organ system which transports materials around the body in the blood.
Respiratory system	The organ system which supplies oxygen for respiration and removes the waste carbon dioxide produced.
Reproductive system	The organ system involved in producing new organisms.
Muscular-skeletal system	The organ system in which muscles and bones work together to cause movement and support the body.
Digestive system	The organ system which breaks down and then absorbs food molecules.
Immune system	Protects the body against infections.
Reproductive system	Produces sperm and eggs, and is where the foetus develops.

Key diagram – organ systems



Key process – organisation of cells, tissues, organs, organ systems and organisms.



Key knowledge

There is a hierarchy of organisation in the human body, an organism made up of organ systems, made of organs, made of tissues, made of cells.

The functions of the skeleton are to support the body, protect vital organs, help the body move and make blood cells.

The circulatory system is made up of the heart, blood and blood vessels.

The nervous system is made up of the brain, spinal cord and the nerves of the body.

The respiratory system is made up of the mouth, nose, trachea, lungs, diaphragm, ribs and intercostal muscles.

The digestive system is made up by the mouth, teeth, salivary glands, gullet, stomach, liver, gallbladder, pancreas, small intestine, large intestine, rectum and anus.

The skeletal system is made up of bones, cartilage, tendons and joints.

The muscular system is made up of different types of muscle e.g. cardiac muscle in the heart, skeletal muscle and smooth muscle.

The reproductive system is made up of the ovaries, fallopian tubes, uterus and vagina in females. In males it includes the penis, testes, scrotum, sperm tube, urethra and glands.

The immune system is made up of white blood cells, the spleen, thymus and bone marrow.