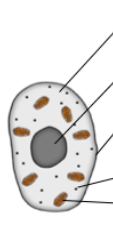


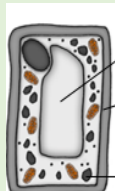
1. Animal Cells

Animal cells are eukaryotic because they have a nucleus.

	cytoplasm	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
	nucleus	<i>contains genetic material</i>	controls the activities of the cell and codes for proteins
	cell membrane	<i>semi permeable</i>	controls the movement of substances in and out of the cell
	ribosome	<i>site of protein synthesis</i>	mRNA is translated to an amino acid chain
	mitochondrion	<i>site of respiration</i>	where energy is released for the cell to function

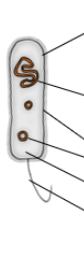
2. Plant Cells

Plant cells are eukaryotic because they have a nucleus.
Plant cells contain all of the animal parts plus a few extra:

	permanent vacuole	<i>contains cell sap</i>	keeps cell turgid, contains sugars and salts in solution
	cell wall	<i>made of cellulose</i>	supports and strengthens the cell
	chloroplast	<i>site of photosynthesis</i>	contains chlorophyll, absorbs light energy

3. Bacteria Cells




Bacteria cells are prokaryotic because they do not have a nucleus.
They are also much smaller than animal and plant cells.

	cytoplasm	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
	bacterial DNA	<i>not in nucleus floats in the cytoplasm</i>	controls the function of the cell. Can be found as chromosomal DNA and plasmid DNA (small rings).
	cell wall	<i>NOT made of cellulose</i>	supports and strengthens the cell
	cell membrane	<i>semi permeable</i>	controls the movement of substances in and out of the cell
	flagella	<i>whip like tail</i>	allows the bacterial cell to move
	ribosome	<i>site of protein synthesis</i>	mRNA is translated to an amino acid chain

CB1 Key Concepts in Biology

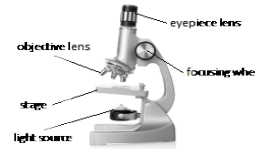
4. Specialised Cells

There are some cells which are specialised (or adapted) to do different jobs in animals and plants.

egg		<i>fertilised by a sperm</i>	nutrients in the cytoplasm, haploid nucleus and changes in the cell membrane after fertilisation
sperm		<i>fertilise an egg</i>	streamlined with a long tail acrossome containing enzymes large number of mitochondria, haploid nucleus
Ciliated epithelial cell		<i>push and move mucus</i>	Thin layer of moving hairs on the surface of the cells called cilia.

5. Microscopes

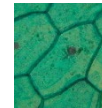
You need to be able to label a microscope as well as describe how to use a light microscope.



Many parts of a cell were not discovered before the electron microscope was invented. This has a larger magnification and higher resolution compared to the light microscope.

To calculate magnification, you can multiply size of the eyepiece lens by the size of the objective lens.

$$\begin{array}{rcl} \text{eg. eyepiece lens} & \times & \text{objective lens} & = & 40\times \\ 10\times & \times & 4\times & = & 40\times \end{array}$$



You can also divide an image size by the actual size.

7. Enzyme Action

The lock and key model is used to explain how enzymes work.



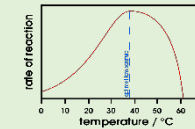
The substrate (key) fits into an active site (lock) which has a specific complementary shape.

Large changes in pH or temperature can cause an enzyme to stop working (denature). The active site changes shape so the substrate no longer fits.

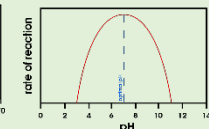


8. Enzyme Activity

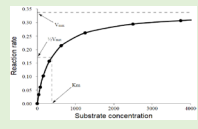
Enzymes increase the rate of specific reactions in living organisms. Enzyme activity is affected by temperature, pH and substrate concentration.



Enzymes have an optimum temperature





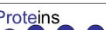



Enzymes have an optimum pH



Increasing substrate concentration increases rate. This is limited by number of active sites.

6. Digestive Enzymes

Enzymes in your digestive system break large insoluble molecules down into smaller soluble molecules that can be absorbed into the blood for transportation.

Carbohydrates	Carbohydrase	Simple sugars
		
<i>Made in the: Salivary glands, Pancreas, Small intestine</i>		
Proteins	Protease	Amino acids
		
<i>Made in the: Stomach, Pancreas, Small intestine</i>		
Fats (lipids)	Lipase	Glycerol + fatty acids
		
<i>Made in the: Pancreas, Small intestine</i>		

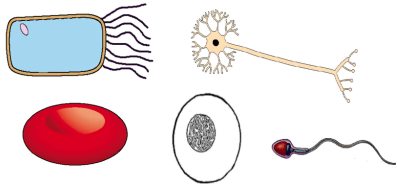
9. Transportation Processes

Diffusion	Osmosis	Active Transport
No energy required	No energy required	Energy required
Particles in solution or gas	Water particles	Movement of particles
Higher concentration to lower concentration	Dilute solution to more concentrated solution	Dilute solution to more concentrated solution
Oxygen and carbon dioxide during gas exchange in lungs	Water into roots via root hair cells	Mineral ions into plant roots Glucose into the small intestine

1. Growth in Animals

Growth is an increase in the number or size of cells. It can be measured by an increase in mass and an increase in length.

At first, cells divide before differentiating to become specialised. Specific structures help specialised (differentiated) cells carry out a particular function.



2. Growth in Plants

Groups of cells at the end of each shoot and root allow a plant to continue to grow. These groups of cells are called meristems. These cells divide by mitosis before increasing in length (elongating) and finally differentiating into specialised plant cells.

Palisade cells are located in the leaf of a plant. They contain a lot of chloroplasts for photosynthesis.



Root hair cells do not contain any chloroplasts. Instead, they have a large surface area to increase the uptake of water and nutrients from the soil.

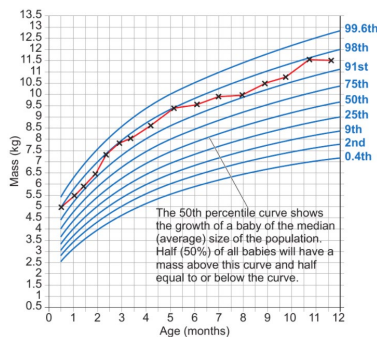


3. Percentile Charts

Percentile charts can be used to monitor growth.

The 50th percentile is the average growth of the population at that age.

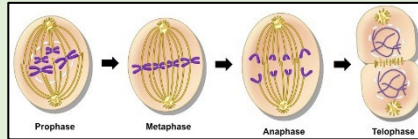
The red line shows how the mass of one baby changes with age (in months old).



CB2 Cells and Control

4. Mitosis

Mitosis is part of the cell cycle and has 5 stages: prophase, metaphase, anaphase, telophase and cytokinesis. Interphase occurs before mitosis as part of the cell cycle.



Interphase – DNA replication makes copies of chromosomes

Prophase – nucleus breaks down and spindle fibres form

Metaphase – chromosomes line up at the equator (middle) of the spindle fibres

Anaphase – chromosome copies are pulled apart to opposite poles (ends) of the cell

Telophase – a new nuclear membrane forms around each set of chromosomes

Cytokinesis – cell membrane forms to separate the cells

Some organisms can reproduce using one parent. This is known as asexual reproduction where the offspring are clones (genetically identical) of the parent. Asexual reproduction is faster but does not result in variation.

Uncontrolled cell division and growth results in the formation of tumours. This is how cancer develops.

5. Stem Cells

Stem cells divide repeatedly before differentiating.

Embryonic stem cells – differentiate into any specialised cell

Adult stem cells – produce cells similar to those around them

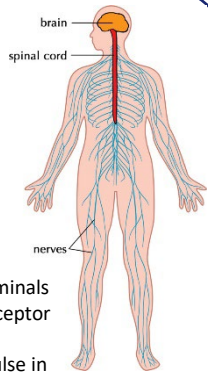
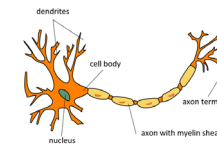
Stem cells are being used to treat a wide range of disease. However, when injected they are often 'rejected' or divide and cause cancer.

6. Asexual Reproduction

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7. Nerves and Nervous System

The Central Nervous System (CNS) is made up of the brain and spinal cord.



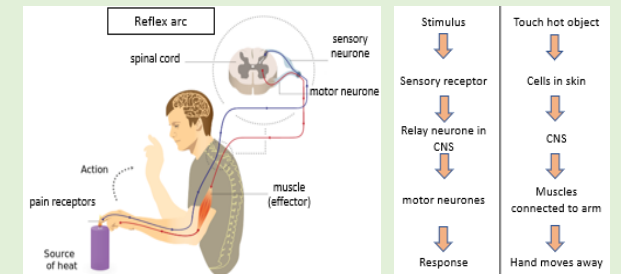
Axon – carries electrical impulse to axon terminals

Dendron – carries electrical impulse from receptor cells in sensory neurones

Myelin sheath – insulates the electrical impulse in the neurones

8. Reflex Arc

Reflexes are automatic and rapid. They do not involve the conscious part of the brain and can protect humans from harm.



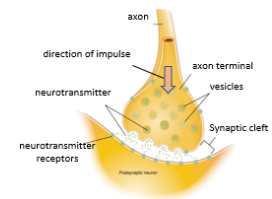
9. Synapses

The gap between two neurones (nerve cells) is called a synapse.

When an impulse (electrical signal) reaches the end of a neurone, a chemical neurotransmitter is released.

It diffuses across the gap (synapse) and is detected by the next neurone which then triggers another impulse.

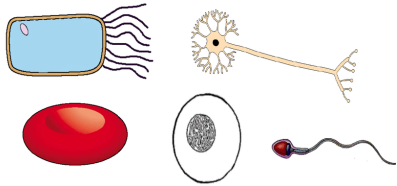
Synapses slow down neurotransmission but do ensure impulses only flow in one direction.



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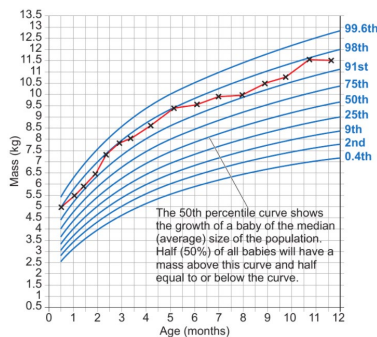


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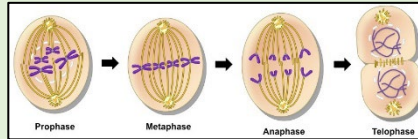
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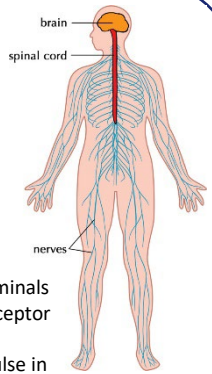
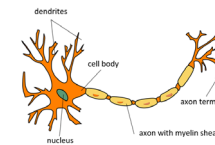
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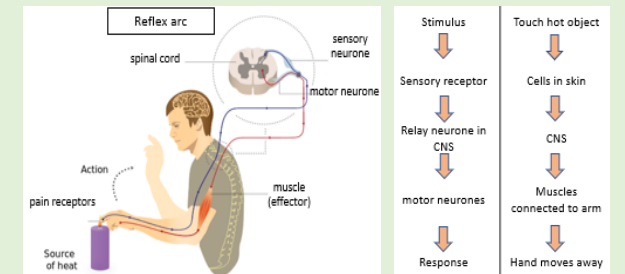
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