Combined Science - Biology

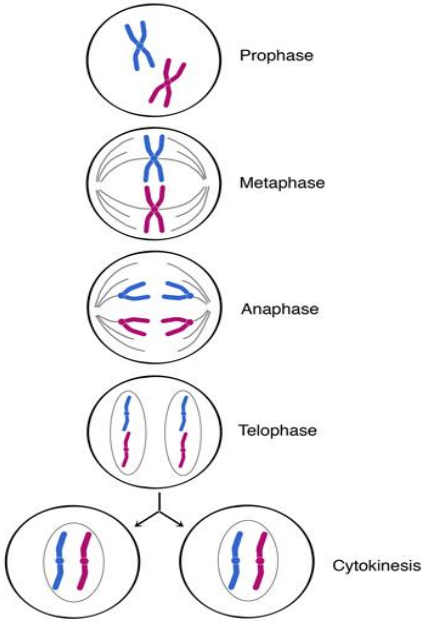
CB1 Knowledge organiser

B2: Cells and control

Lesson sequence

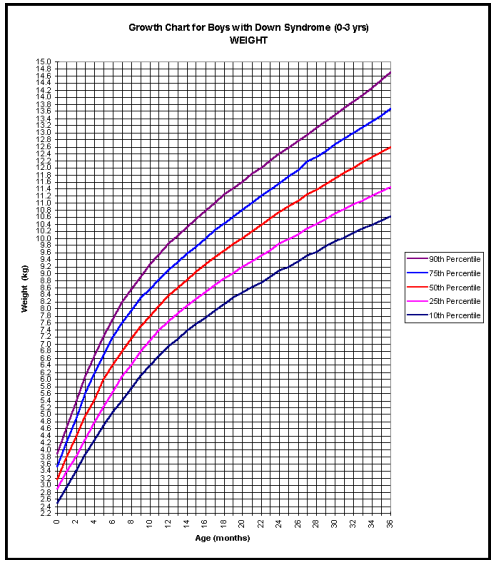
1. Mitosis
2. Animal growth
3. Plant growth
4. Stem cells
5. Nervous system
6. Neurotransmission
7. Controlling movement

1. Mitosis	
Cell cycle	The life of a cell comprising interphase and mitosis.
Interphase	Preparation for mitosis in which extra cell parts are made and DNA chromosomes are replicated (copied).
Mitosis	When one cell divides into two genetically identical daughter cells.
(I)PMATC	The stages of mitosis: interphase (not mitosis), prophase, metaphase, anaphase, telophase, cytokinesis.
Prophase	The membrane of the nucleus breaks down and spindle fibres start to form.
Metaphase	Spindle fibres fully form and chromosomes line up across the middle of the cell.
Anaphase	Chromosome copies separate and move to each end of the cell.
Telophase	A new membrane forms around each set of chromosomes to form two nuclei.
Cytokinesis	The two new cells fully separate.
Cancer	When mitosis happens out of control forming large lumps of cells called tumours.



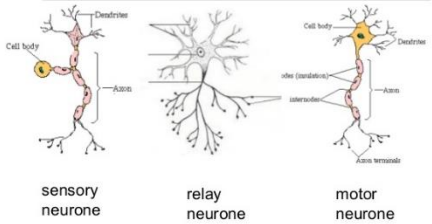
2. Animal growth	
Growth	Increase in size due to increased numbers of cells.
Percentile	A measure of the growth of a child that compares them to other children of the same age.
90th percentile	A child is taller than 90% of children of the same age.
50th percentile	Average for height/mass for the age.
Percentile graphs	Graphs showing how height/mass change with age with different lines for each percentile.
Cell differentiation	When a cell divides by mitosis to produce two different types of cell (not two identical ones).
Specialised cell	A cell special features designed for a specific job.
Importance of differentiation in animals	To produce all the different types of cell the body needs such as red blood cells, fat cells, nerve cells and muscle cells.

3. Plant growth	
Plant growth	Cell division creates more cells, elongation makes these cells get bigger.
Meristems	Areas just behind the tips of roots and shoots where cell division and differentiation happens.
Importance of differentiation in plants	To produce all the different types of cell a plant needs such as root hair cells and xylem cells.
Calculating percentage changes	% change = (final value – starting value) / starting value x 100



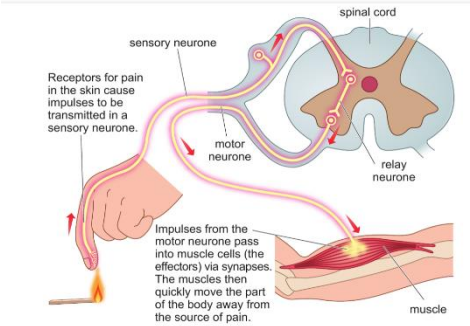
4. Stem cells	
Stem cell	A cell that can differentiate when it divides, to produce two different cells.
Embryonic stem cell	A stem cell that can become any kind of cell. Found in developing embryos.
Adult stem cell	A stem cell that can only become a few types of cell. Found in animals after birth.
Stem cells in medicine	It is hoped they can be used to replace damaged cells in diseases like type 1 diabetes or leukaemia, or to grow new organs for transplant.
Problems with stem cells	They may potentially cause cancer, stem cells can only be used in the person they have come from.

5. Nervous system	
Nervous system	All the nerves in your body working together to gather information, make decisions and control responses.
Central nervous system	The brain and spinal cord – makes decisions (aka CNS).
Peripheral nervous system	All your other nerves – gathers information from your senses and carries messages from the CNS to your muscles.
Neurone	A nerve cell
Impulse	Electrical message carried by a neuron.
Cell body	The central part of a nerve cell containing its nucleus.
Dendron and axon	The long parts of a nerve cell carrying impulses towards the cell body (dendron) and away from it (axon)
Myelin sheath	A fatty layer around the axon and dendron that insulates it to prevent the impulse from escaping and speeds the impulse up.



6. Neurotransmission	
Neurotransmission	The travelling of an impulse along a neurone and into another.
Dendrites	Branches at the beginning of a dendron that connect to receptor cells or another neurone.
Axon terminals	Branches at the end of an axon that connect to a muscle or another neurone.
Synapse	Small gap between two neurones where the axon terminals of one meet the dendrites of another.
Neurotransmitter	Chemicals released by axon terminals that diffuse across the synapse to trigger a new impulse the dendrite of another neurone.
Sensory neurone	Nerve cell that carries impulses from sense organs to the CNS. Has a long dendron and a long axon.
Relay neurone	Nerve cell in the CNS that makes decisions. Dendrites join onto cell body, short axon.
Motor neurone	Nerve cell that carries impulses from the CNS to muscles. Dendrites join onto cell body, long axon.

7. Controlling movement	
Stimulus	A piece of information detected by the nervous system.
Receptor	Cells that detect a stimulus.
Response	The action that the nervous system makes happen.
Effector	The body part that produces the response, often a muscle.
Voluntary movement	A stimulus is detected by a receptor, causing an impulse to be carried by a sensory neuron to the brain. Relay neurones in the brain decide what to do and send another impulse down a motor neuron to the effector (muscle) to cause a response.
Reflexes	Automatic responses that happen very quickly without conscious thought to keep the body safe.
Reflex arc	Movement is caused in the same way as for voluntary movement, except the spinal cord makes the decision without needing the brain to think.



E a reflex arc