Knowledge Organiser: Biology, SB2a

Mitosis occurs during growth, repair and replacement of cells

Mitosis produces **two genetically identical diploid cells**

Interphase happens before mitosis; increase in the number of sub cellular structures e.g ribosomes, mitochondria. DNA replication makes copies of chromosomes

Stages of mitosis
Prophase: Nucleus breaks down and spindle fibres appear
Metaphase: Chromosomes are lined up on spindle fibres on the equator of the cell
Anaphase: Chromosome copies are separated and pulled to opposite ends of the cell
Telophase: A new nuclear membrane forms around each set of chromosomes
Cytokinesis: Cell surface membrane forms to separate the cells (and new cell wall in plants)

Human embryonic stem cells can be cloned and made to differentiate into any cell type

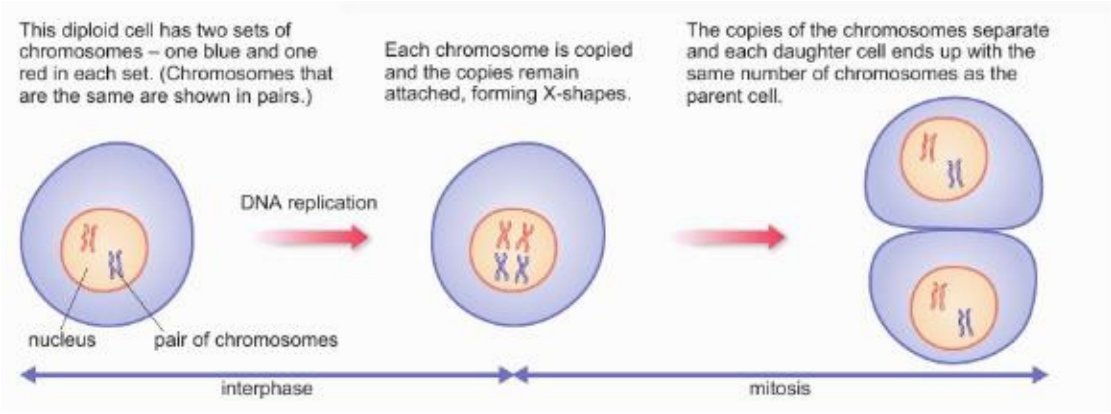
Adult stem cells Can form into surrounding human cells e.g. blood cells

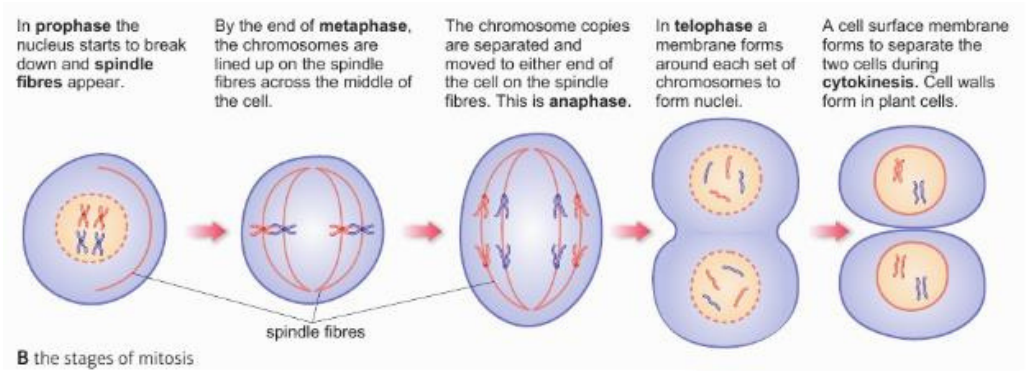
Meristems (plants) Can differentiate into any plant cell type throughout the life of the plant

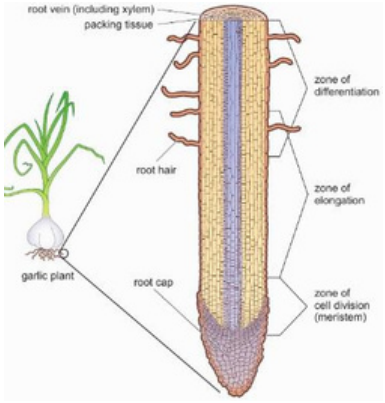
Therapeutic cloning of stem cells to produce new tissue uses same genes so the body does not reject the tissue

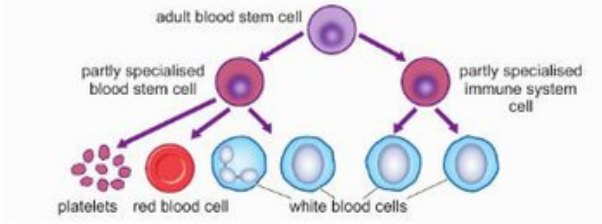
Tissue made from adult stem cells is matched to avoid rejection but only a few types of cell can be formed

Meristems can be used to produce clones quickly and economically, e.g rare species, crop plants with pest/disease resistance



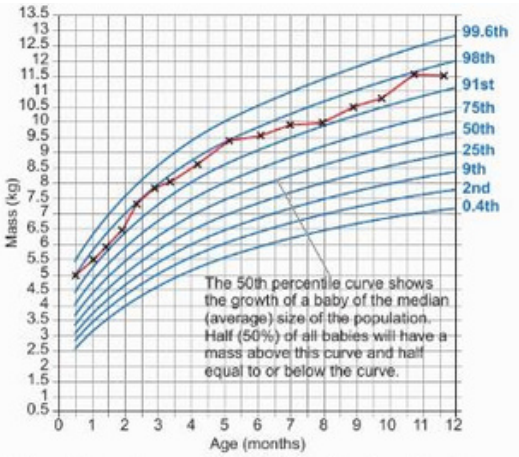




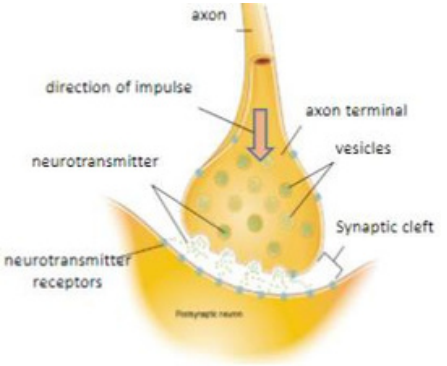


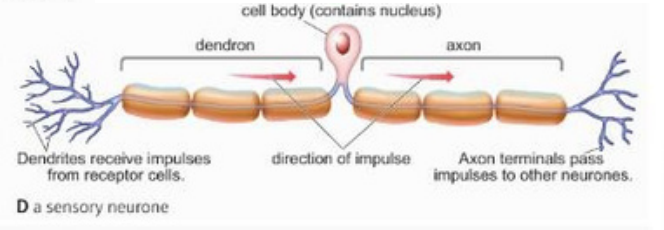
Knowledge Organiser: Biology, SB2b

1	Growth in plants-Cell division, differentiation and elongation (cells increase in length)
2	Growth in animals-cell division and differentiation
3	**Percentile charts can be used to monitor growth**
4	Information from receptors passes along neurones as electrical impulses to the central nervous system (CNS)
5	The CNS is the brain and spinal cord
6	Sensory receptors detect stimuli e.g pressure
7	**Sensory neurones long axon carries impulse from receptor to spinal cord**
8	Synapse-Gap where neurones meet. Chemical message using neurotransmitter
9	Relay neurone in CNS-Allows impulses to travel between sensory and motor neurone in the spinal cord
10	Motor neurone-Long axon carries impulse from receptor to effector
11	Effector-Muscle or gland that carries out a response.
12	Reflex actions are automatic and rapid; they do not involve the conscious part of the brain and protect humans from harm

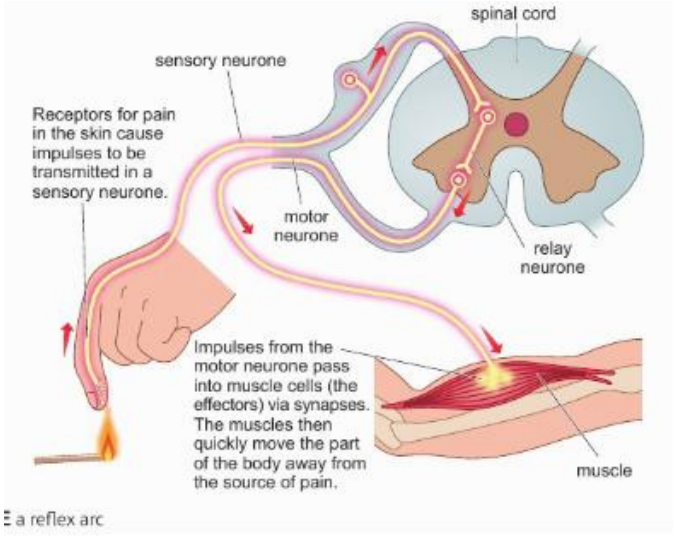


B Percentile growth curves for UK baby boys from 2 weeks to 1 year, for mass. The red line that has been plotted on the curves shows the growth of one baby.





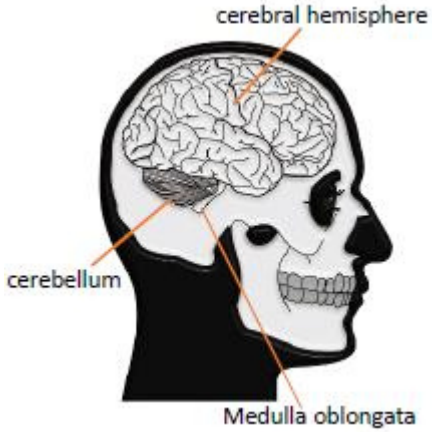
D a sensory neurone

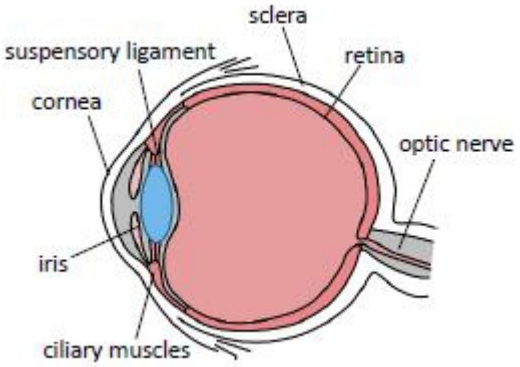


E a reflex arc

Knowledge Organiser: Biology, SB2c

1	The **brain**controls complex behaviour. It is made of billions of interconnected neurones and has different **regions**that carry out different functions.
2	The **cerebral hemispheres** are the largest part of the human brain that control higher thinking skills e.g. **speech, decision making**
3	The **cerebellum**controls **balance and voluntary muscle** functions e.g. walking and lifting.
4	The **medulla oblongata** controls **involuntary**(automatic) body functions e.g. breathing, heart rate.
5	The **complexity**and **delicacy**of the brain makes treating brain tumours/spinal injuries very difficult. Neuro-scientists have been able to overcome this by using **CT and PET scanning**.
6	**Hyperopia (long sightedness**) happens when the lens cannot be made thick enough. It is treated using a convex lens so the light is focused on the retina.
7	**Myopia (short sightedness**) is where the lens is too thick and is treated using a concave lens so light is focused on the retina.
8	**Cataracts**are caused by protein build up in the lens blocking light entering the eye. They can be removed with surgery and an artificial lens inserted.





Structures of the eye	
Retina	Light sensitive cell layer made of rod (light intensity) and cone (red, green, blue colour perception) cells.
Optic nerve	Carries impulse to brain.
Cornea	Transparent layer that covers the pupil and iris.
Iris	Controls size of pupil and the amount of light let in the eyes
Lens	Changes thickness to refract and focus light onto the retina.