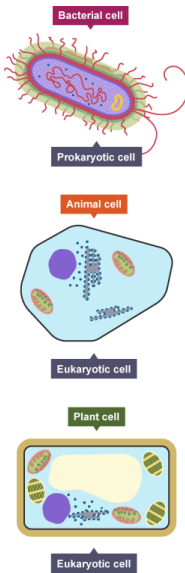


Week 1

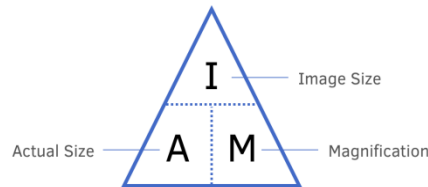
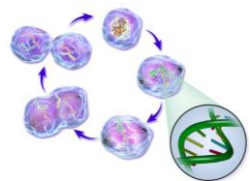
Big Picture: Growth and Differentiation



Plant and animal cells are **eukaryotic cells** have membrane-bound organelles (part of a cell that carries out a specific function) and have genetic material contained in the nucleus. All eukaryotic cells have a nucleus, mitochondria, ribosomes, cytoplasm and a cell membrane. Plant cells also have a cell wall, vacuole and chloroplasts.

Mitochondria are the site of aerobic respiration which releases energy for cellular processes. **Ribosomes** are the site of protein synthesis.

Prokaryotic cells do not contain membrane-bound organelles and are smaller than eukaryotic cells. Instead of a nucleus, they have loops of DNA or rings called plasmids.

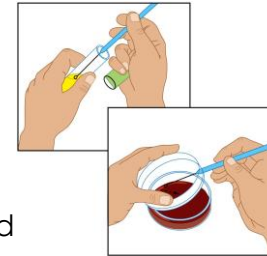


Week 2

Big Picture: Growth and Differentiation

Microscopy is using microscopes to view samples that cannot be seen with the naked eye. Light microscopes allow us to see the largest organelles, including the nucleus, cell membrane, cell wall. Electron microscopes have a greater magnification and resolution than light microscopes. They are much more expensive than light microscopes but have a higher **resolution** and **magnification**.

Petri dishes are used to produce cultures of bacteria and other micro-organisms. **Aseptic techniques** must be used to prepare cultures to prevent contamination of the culture and the growth of harmful bacteria.

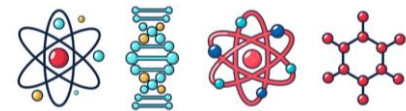
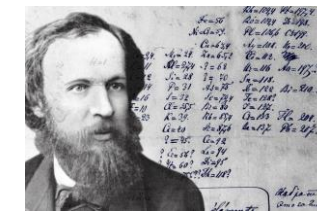


Week 3

Big Picture: Growth and Differentiation

Diffusion is the spreading out of particles, of a gas or liquid, resulting in net movement from an area of high concentration to low concentration. The rate of diffusion is increased by an increase in temperature, an increase in the difference in concentrations (concentration gradient), a greater surface area. Large, multicellular organisms have adaptations to increase the surface area to volume ratio to allow for efficient exchange of substances. **Osmosis** is the diffusion of water from a dilute solution to a concentrated solution through a partially permeable membrane that lets particular substances pass through it, either into or out of the cell. **Active transport** moves substances from a more dilute solution to a more concentrated solution, requiring energy from respiration and works against the concentration gradient. Active transport is used in root hair cells to absorb mineral ions from the soil that are essential for plant growth.

Year 9 Science: Term 1 Growth and Differentiation, The Periodic Table



Week 4

Big Picture: Growth and Differentiation

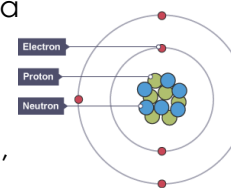
Both eukaryotic and prokaryotic cells undergo cell division by dividing into two. The eukaryotic **cell cycle** contains a growth phase where the cell grows to double sub-cellular structures (such as ribosomes and cell membrane) and DNA, then the cell splits into two during mitosis. **Cancer** is caused by uncontrolled cell division which creates a tumour.

Malignant tumours are formed of cancer cells that invade other tissues and spread around the body. A risk factor is a gene or lifestyle choice that can increase the likelihood of a person developing a disease e.g. poor diet, smoking, UV exposure. **Stem cells** are cells that are capable of **differentiating** into other types of cell to make them specialised for a function. Embryonic stem cells can differentiate into all human cell types but adult bone marrow contains stem cells that can only differentiate into different blood cells.

Week 5 & 6

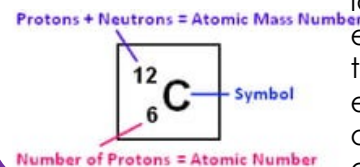
Big Picture: The Periodic Table

Atoms are very small and are made of a positively charged nucleus, containing protons and neutrons, surrounded by negatively charged electrons. The electrons are arranged in energy levels, which are different distances from the nucleus.



Atoms have no overall electrical charge because the number of electrons is equal to the number of protons in the nucleus.

Atoms form positive ions if they lose one or more outer electrons and negative ions if they gain one or more outer electrons. Isotopes are atoms of the same element that have different numbers of neutrons.



Key words:

Active Transport - The movement of molecules from a dilute to a more concentrated solution against a concentration gradient using energy from respiration.

Diffusion - The movement of particles from a high concentration to a low concentration

Mitochondria - A membrane bound structure in a cell that is the site of aerobic respiration.

Alkali Metals - An element in group 1 of the periodic table.

Isotopes - Atoms of the same element with mass numbers due to different numbers of neutrons in the nucleus.

Periodic Table - A table of all the known elements arranged in order of atomic number so that elements with similar properties are in columns, known as groups.

Week 1

Questions	Answers
Name two types of cell	Prokaryotic and Eukaryotic
Where does respiration happen?	Aerobic respiration happens in the mitochondria
Why does a plant cell need walls?	Plant cells have walls to give it a definite shape?
Describe the function of the cell membrane	The cell membrane controls what goes in and out of the cell
What is an organelle?	Organelles are parts of a cell.

Week 2

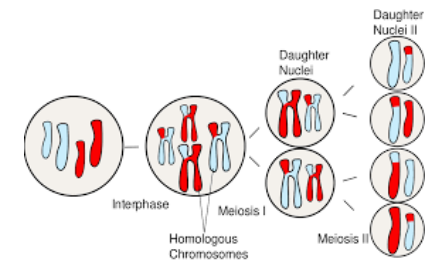
Questions	Answers
Define resolution	The ability to see detail.
Name two types of microscopes	Electron microscope and light microscope.
Why is aseptic technique important?	So you do not contaminate your sample and produce dangerous bacteria.
Why do we need microscopes?	To allow us to see what small things are made from.
Which lens do you start with on a microscope?	The lowest power lens to give the greatest field of vision.

Week 3

Questions	Answers
Define diffusion	It is the movement of particles from an area of high to low concentration.
Why is diffusion a passive process.	Diffusion is passive as it does not require energy?
Why does active transport need energy?	Because the particles are going against the concentration gradient.
Which process moves oxygen from the alveoli into the blood	Diffusion is the process which moves oxygen from the alveoli into the blood.
Describe osmosis	It is the movement of water from an area of high to low concentration across a semi permeable membrane.

Eukaryotic cells	Prokaryotic cells
Big and complex cells.	Small and simple cells.
<ul style="list-style-type: none"> ✓ Nucleus ✓ Cell wall ✓ Cell membrane ✓ Cytoplasm ✓ Membrane-bound organelles 	<ul style="list-style-type: none"> ✓ Loop or small rings of DNA ✓ Cell wall ✓ Cell membrane ✓ Cytoplasm ✗ Membrane-bound organelles

Year 9 Science: Term 1 Growth and Differentiation, The Periodic Table



Week 4

Questions	Answers
Why are stem cells useful	Stem cells can become any type of cell.
Why do we need to cell cycle?	To make new cells for growth and repair.
What are risk factors?	Something which increases your chance of something occurring.
Define differentiation?	When a stem cells becomes specialised.
What is cancer?	Cancer is when cells in your body replicate uncontrollably.

Week 5 & 6

Questions	Answers
Why do atoms have an overall charge of zero?	They have an equal number of positive and negative charges.
Why did Mendeleev leave gaps	He predicted the properties of undiscovered elements and left gaps for them.
Define ion	An ion is an atom which has lost or gained electrons.
What is the charge of a metal ion?	Metal ions are always positive.
What makes an isotope	Different number of neutrons.

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