Y7 Cycle 1 Science Scholar's Guide

Oxford Spires Academy

Full Name: _____

Tutor Group: _____

Science Class: _____

Science Teacher(s): _____

Science Y7

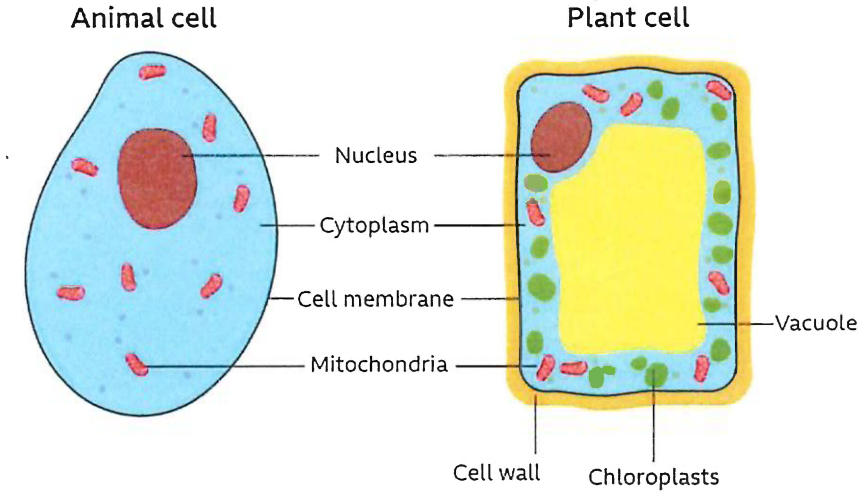
Cycle 1

The Knowledge Organisers contain all the knowledge you need to learn. Below is what you need to be able to do.

	7.1 Cells and Microbes	7.2 Solids, Liquids and Gases
	To learn how to be safe in a Science Lab. Explain how to use a microscope to identify and compare different types of cells.	To learn how to be safe in a Science Lab. Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles.
	Describe how different cells are adapted to their function. Suggest what kind of tissue or organism a cell is part of, based on its features. Describe how cells divide.	Explain changes in states in terms of changes to the energy of particles.
	Identify the different organ systems of the body. Describe the function of the skeleton and joints. Describe how muscle pairs work.	Explain unfamiliar observations about gas pressure in terms of particles. Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion.
	Mid Point Assessment Re-teach. Explain how uni-cellular organisms are adapted to carry out functions that in multi-cellular organisms are done by different types of cell. Describe what a microbe is.	**Mid Point Assessment Re-teach.** Explain how substances dissolve using the particle model. Use the solubility curve of a solute to explain observations about solutions.
	Be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants. Be able to explain how the spread of diseases can be reduced or prevented. Be able to explain how vaccination will prevent illness in an individual. Be able to explain the use of antibiotics and other medicines in treating disease.	Devise ways to separate mixtures, based on their properties. Choose the most suitable technique to separate out a mixture of substances. Use evidence from chromatography to identify unknown substances in mixtures.
11&12	Assessment & Reteach	Assessment & Reteach

7.1 Cells and Microbes KO 1

Know
Multicellular organisms are composed of cells. Each has a different structure or feature so it can do a specific job.



Fact
Both plant and animal cells have a **cell membrane, nucleus, cytoplasm and mitochondria.**
Plant cells also have a **cell wall, chloroplasts and usually a permanent vacuole.**

Key Word	Meaning
Cell	The unit of a living organism, contains parts to carry out life processes.
Uni-cellular	Living things made up of one cell.
Multi-cellular	Living things made up of many types of cell.
Cell membrane	Surrounds the cell and controls movement of substances in and out.
Nucleus	Contains genetic material (DNA) which controls the cell's activities.
Vacuole	Area in a cell that contains liquid, and can be used by plants to keep the cell rigid and store substances.
Mitochondria	Part of the cell where energy is released from food molecules.
Cell wall	Strengthens the cell. In plant cells it is made of cellulose.
Chloroplast	Absorbs light energy so the plant can make food.
Cytoplasm	Jelly-like substance where most chemical processes happen.

7.1 Cells and Microbes KO 2

Know

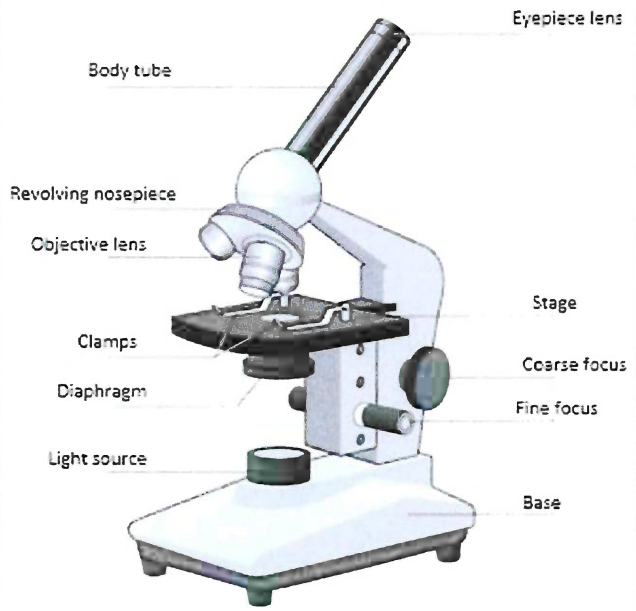
Each cell has a different structure or feature so it can do a specific job.

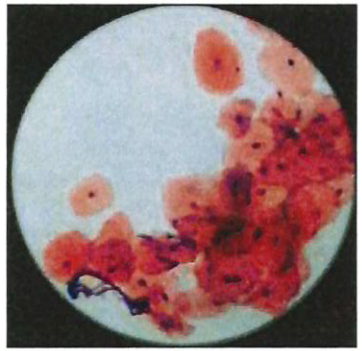
Structural adaptations are special features to help a cell carry out its functions.

Skill

Use a light microscope to observe and draw cells.

Parts of a microscope





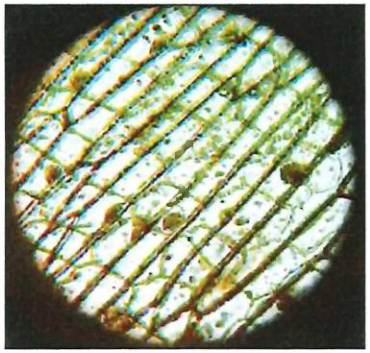
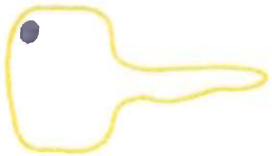
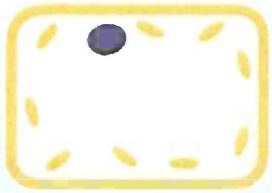
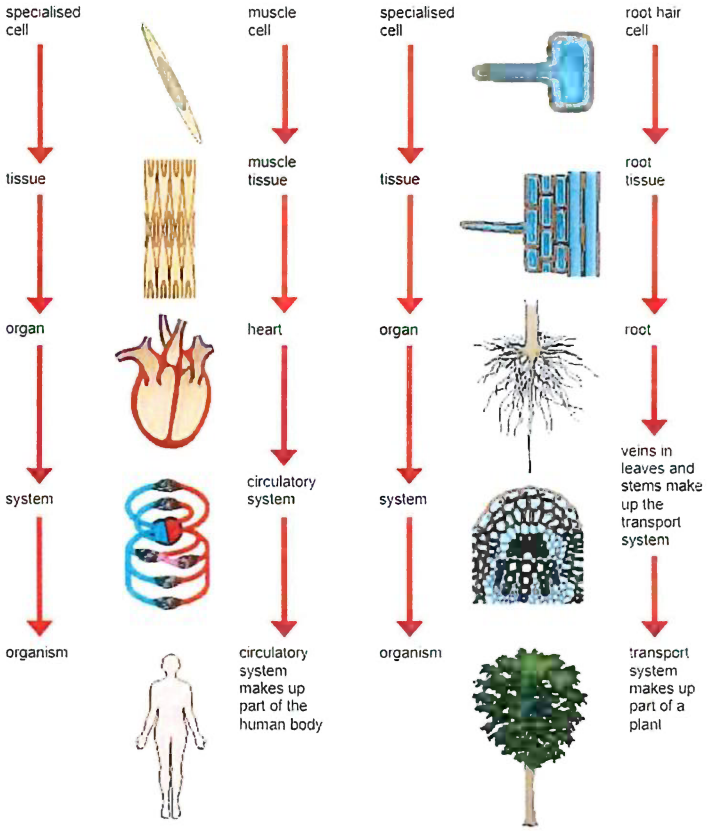


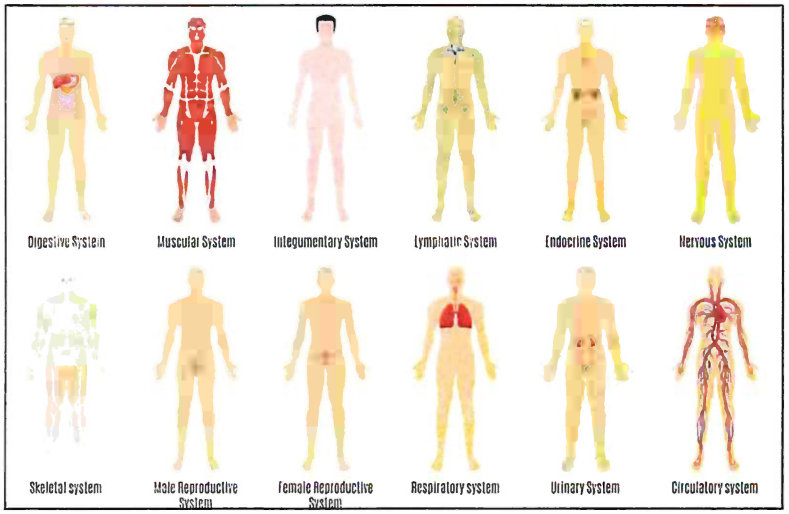
Image	Type of animal cell	Function	Special features
	Red blood cells	To carry oxygen	• Large surface area, for oxygen to pass through • Contains haemoglobin, which joins with oxygen • Contains no nucleus
	Nerve cells	To carry nerve impulses to different parts of the body	• Long • Connections at each end • Can carry electrical signals
	Female reproductive cell (egg cell)	To join with male cell, and then to provide food for the new cell that's been formed	• Large • Contains lots of cytoplasm
	Male reproductive cell (sperm cell)	To reach female cell, and join with it	• Long tail for swimming • Head for getting into the female cell

Image	Type of plant cell	Function	Special features
	Root hair cell	To absorb water and minerals	• Large surface area
	Leaf cell	To absorb sunlight for photosynthesis	• Large surface area • Lots of chloroplasts

7.1 Cells and Microbes KO 3

Know Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. There are many types of cell.
Each has a different structure or feature so it can do a specific job.



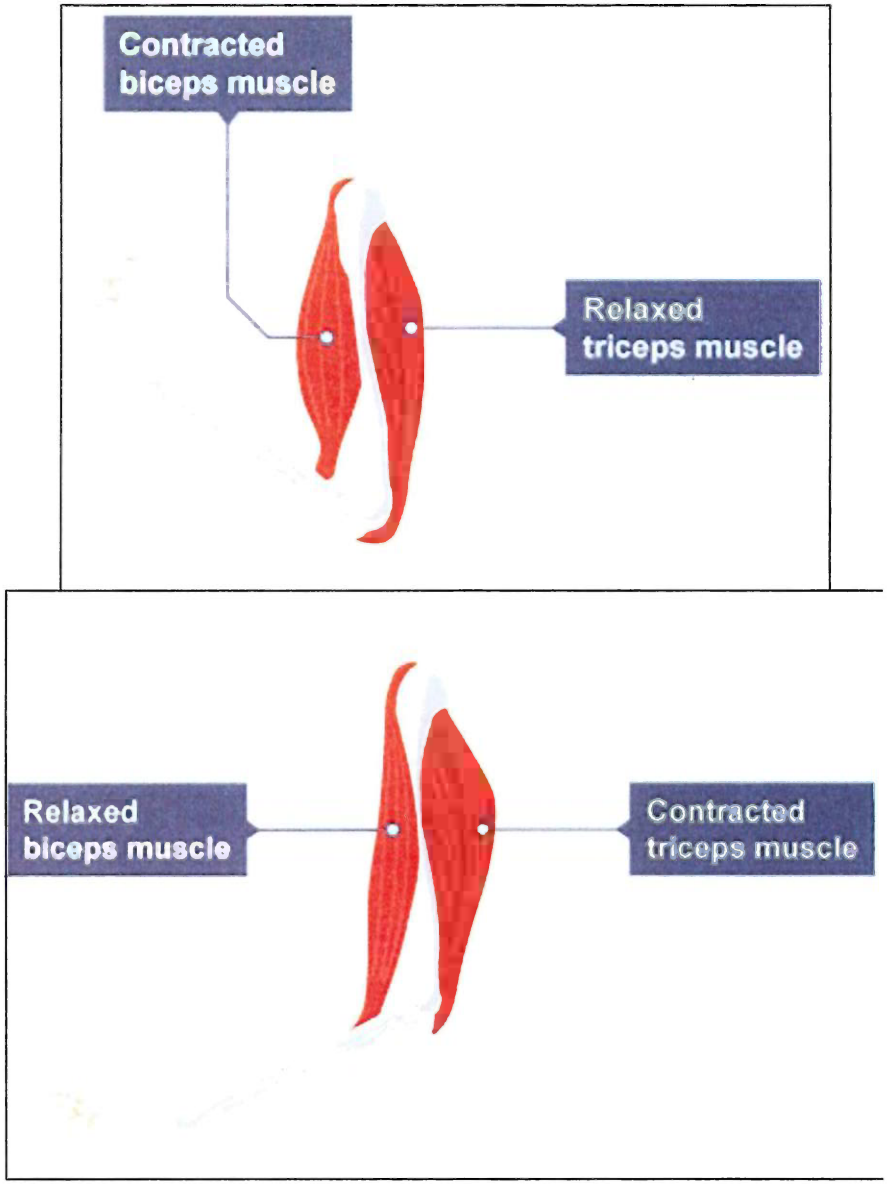


Key Word	Meaning
Immune system	Protects the body against infections.
Reproductive system	Produces sperm and eggs, and is where the foetus develops.
Digestive system	Breaks down and then absorbs food molecules.
Circulatory system	Transports substances around the body.
Respiratory system	Replaces oxygen and removes carbon dioxide from blood.
Muscular skeletal system	Muscles and bones working together to cause movement and support the body.

7.1 Cells and Microbes KO 4

Know
The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells. Antagonistic pairs of muscles create movement when one contracts and the other relaxes.

Key Word	Meaning
Joints	Places where bones meet.
Bone marrow	Tissue found inside some bones where new blood cells are made.
Ligaments	Connect bones in joints.
Tendons	Connect muscles to bones.
Cartilage	Smooth tissue found at the end of bones, which reduces friction between them.
Antagonistic muscle pair	Muscles working in unison to create movement.

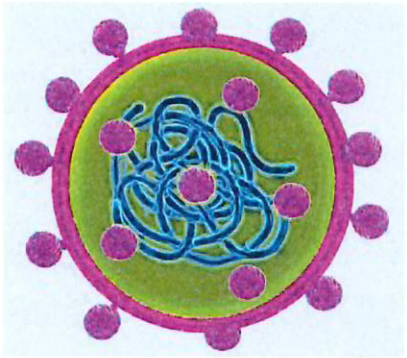


7.1 Cells and Microbes KO 5

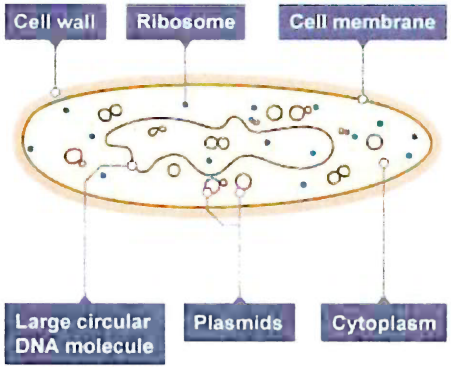
Know
Be able to explain how diseases caused by viruses, bacteria and fungi are spread in animals and plants.
Know that pathogens are microorganisms that cause infectious disease. Pathogens may be viruses, bacteria or fungi. They may infect plants or animals and can be spread by direct contact, by water or by air. Bacteria and viruses may reproduce rapidly inside the body. Bacteria may produce poisons (toxins) that damage tissues and make us feel ill. Viruses live and reproduce inside cells, causing cell damage.

Apply
Be able to explain how the spread of diseases can be reduced or prevented.

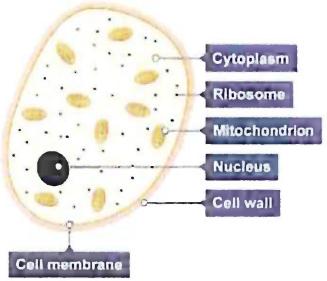
Key Word	Meaning
Pathogen	A microorganism that causes infectious diseases in animals or plants.
Virus	Viruses are very small particles capable of infecting every type of living organism. They are parasitic and can only reproduce inside living cells.
Bacteria	Bacteria are microscopic single-celled organisms. They do have a cell wall. They do not have a nucleus, but instead they have a circular chromosome of DNA.
Fungi	Mushrooms, toadstools and moulds are multicellular fungi. Yeast is an example of a single-celled fungus.
Protist	Microorganisms that have features that belong to animals, plants and fungi.



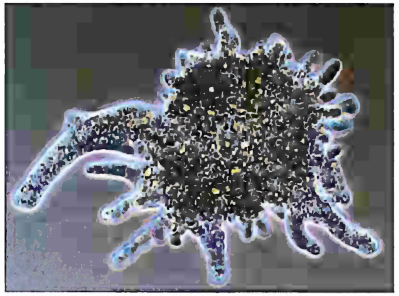
Hepatitis virus



Bacterium



Yeast cell (fungus)



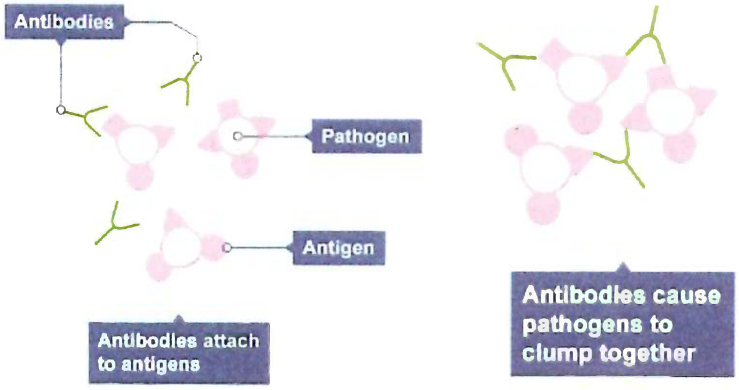
Amoeba (protist)

7.1 Cells and Microbes KO 6

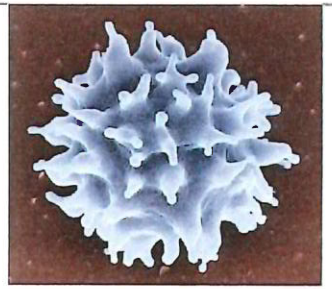
Key Word	Meaning
Antibiotic	Antibiotics are medicines that help to cure bacterial disease by killing **bacteria** inside the body. They **cannot kill viruses**.
Immune	When the body has a high enough antibody level to protect against an infection.
Vaccination	Small quantities of dead or inactive forms of a pathogen are put into the body to make white blood cells make antibodies. If the same pathogen re-enters the body the white blood cells respond quickly to make the correct antibodies and stop infection.

Key Word	Meaning
Immune system	The system in the body which protects us from infection.
White blood cell	Part of the immune system which protect us against infection.
Antibodies	The body makes these to recognise and attack pathogens.
Toxins	These are made by pathogens and make you feel ill.
Airborne	Spread of a pathogen through the air e.g. by sneezing or coughing.
Waterborne	Spread of a pathogen through water e.g. by drinking dirty water.
Direct contact	Spread of a pathogen through touch e.g. by shaking hands.

Destruction of a pathogen



White blood cell



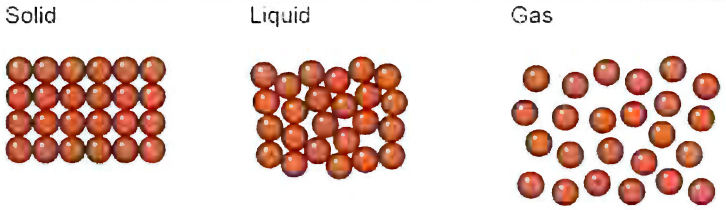
7.2 Solids, liquids and gases KO 1: Particle model

Know

Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas).

Observations where substances change temperature or state can be described in terms of particles gaining or losing energy.

Diagram



Fact

A substance is a solid below its melting point, a liquid above it, and a gas above its boiling point.

Key Word	Meaning
Particle	A very tiny object such as an atom or molecule, too small to be seen with a microscope.
Particle model	A way to think about how substances behave in terms of small, moving particles

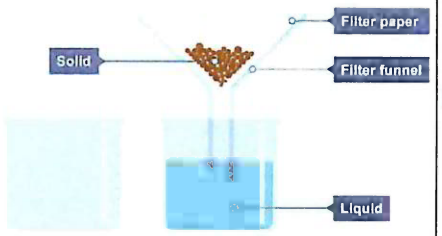
Key Word	Meaning
Diffusion	The process by which particles in liquids or gases spread out through random movement from a region where there are many particles to one where there are fewer
Gas pressure	Caused by collisions of particles with the walls of a container.
Density	How much matter there is in a particular volume, or how close the particles are.
Evaporate	Change from liquid to gas at the surface of a liquid, at any temperature.
Boil	Change from liquid to a gas of all the liquid when the temperature reaches boiling point.
Condense	Change of state from gas to liquid when the temperature drops to the boiling point.
Melt	Change from solid to liquid when the temperature rises to the melting point.
Freeze	Change from liquid to a solid when the temperature drops to the melting point.
Sublime	Change from a solid directly into a gas

7.2 Solids, liquids and gases KO 2 Separating mixtures

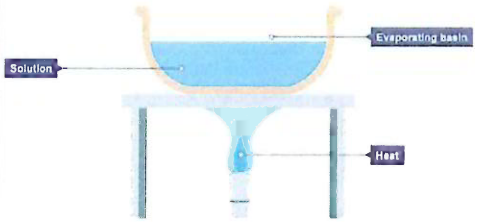
Know

A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may be separated due to differences in their physical properties. The method chosen to separate a mixture depends on which physical properties of the individual substances are different.

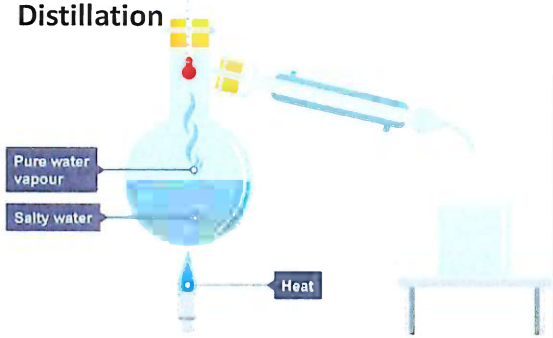
Filtration



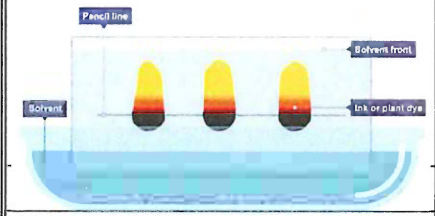
Evaporation



Distillation



Chromatography



Fact

Air, fruit juice, sea water and milk are mixtures.
Liquids have different boiling points

Key Word	Meaning
Solvent	A substance, normally a liquid, that dissolves another substance.
Solute	A substance that can dissolve in a liquid.
Dissolve	When a solute mixes completely with a solvent.
Solution	Mixture formed when a solvent dissolves a solute.
Soluble (insoluble)	Property of a substance that will (will not) dissolve in a liquid.
Solubility	Maximum mass of solute that dissolves in a certain volume of solvent.
Pure substance	Single type of material with nothing mixed in.
Mixture	Two or more pure substances mixed together whose, properties are different to the individual substances.
Filtration	Separating substances using a filter to produce a filtrate (solution) and residue.
Distillation	Separating substances by boiling and condensing liquids.
Evaporation	A way to separate a solid dissolved in a liquid by the liquid turning into a gas.
Chromatography	Used to separate different coloured substances.