Science Knowledge Organisers

Year 7 PC3 (June Exam)

Kettering science Academy

What is a 'knowledge organiser'?

A knowledge organiser is simply a collection of the all of the information which your teacher would like you to be able to **recall** from a particular topic. That means that it **does not have everything on it** for a unit of study but it does have **the most essential things to learn.**

A knowledge organiser has lots of facts and definitions on it. Did you know that there is as many new words in studying science as there is in studying a language?

A knowledge organiser does **not develop skills**, so good revision will involve **lots of practice questions** as well as learning the content of these organisers.

What do I do with it?

For most of us, the first thing that we learned at school in reception was our phonics sounds. We learned them by repetition – seeing them again and again until the association between the sound and the image stuck. We need to do the same thing with these knowledge organisers!

Your teacher will probably be using knowledge organisers as you are taught. They will be referred to in class and you should have regular small tests on what you have learned.

Our knowledge organisers are deliberately broken into small lesson sized chunks for you to learn. Typically a teacher may ask you to 'learn box 2 and 3' for a homework.

By the time you come to an assessment – an exam or test – you should already be familiar with the knowledge organisers and already know some of it. They can then be relearned as a part of the revision and assessment preparation procedure.

Retrieval Practice

A key part of learning anything is the act of trying to remember. In class, your teacher will be helping you to do this by asking lots of questions and setting quizzes. **The more often you try to remember something the more likely you are to remember it**. With knowledge organisers you can achieve the same thing at home.

Why are we doing this?

Research has shown that **the more you know** the **more you can learn.** By being able to recall the facts, you are able to understand more complicated ideas because you **already know what the key words mean.** You will also already have a set of ideas in your mind that the new ideas can connect to (this is often referred to as a **schema**).

What are the best techniques for memorising using a knowledge organiser?

READ COVER WRITE

Make sure you are working somewhere quiet and that you have something to write with and some paper. Focus on learning on part of the knowledge organiser only, for example box one. Read through it carefully several times. When you think you've got it, cover over the knowledge organiser and write it all down. Then check what you've been able to remember. Read the bits that you could not recall, cover and write again.

TEST ME

Once you have learned the sections, its time to see if you can remember larger amounts.

Ask a friend or family member to test you on the content of the knowledge organiser page. They don't need to be experts – only to say whether you have remembered it correctly.

TEST EACH OTHER

If you are revising with class mates, testing each other is great. By doing this you are thinking about what you need to know when you are answering questions but also when you are checking to see if your class mate is right. This works well on video calls!

MAKING FLASH CARDS

Some students find making flash cards really helps. You are thinking about what needs to be learned as you write! But don't fall into the trap of writing them and never using them! Once written they should be used regularly – you can test yourself with them or test each other!

Spaced Learning

All of the techniques work best when they are done **little and often**. Aim to repeat something you have learned a week – studies have shown that once you learn something, if you see it again after a week recall is better long term. Then again after a month… and so on.

Application

Once you have memorised some of the information, or have made a good start, it's a good idea to start trying to **use that knowledge**. Websites like **Seneca** and **Educake** provide great banks of questions for this.

7A Cells, Tissues, Organs and Systems

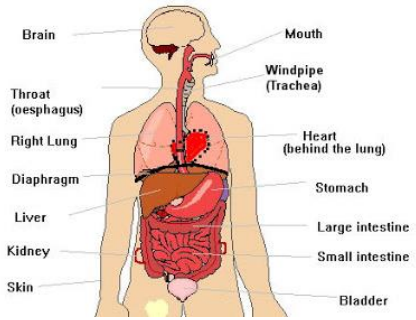
1. Life Processes

Life Processes	If something can do all 7 life processes it is considered a 'living thing' They are; movement, reproduction, sensitivity, growth, respiration, excretion and nutrition.
Organism	A living thing.
Movement	Being able to move from place to place or move part of themselves.
Reproduction	Being able to make more living things like themselves.
Sensitivity	Being able to sense and react to things around them.
Growth	Being able to increase in size.
Respiration	Being able to release energy through respiration.
Excretion	Being able to get rid of waste materials.
Nutrition	Taking in substances (such as food) to help carry out the other processes.

2. Organs

Organ	A part of animals or plants that does an important job- made up of different tissues.
Function	The job or role something has.
Brain	Controls the body.
Skin	The bodies biggest organ- used for protection and sensing things.
Lungs	Take in oxygen for respiration and excrete carbon dioxide.
Heart	Pumps blood around the body.
Liver	Makes and destroys substances.
Kidneys	Clean the blood and produce urine to excrete waste.
Bladder	Stores urine.
Stomach	Breaks up food.
Small Intestine	Breaks up food and absorbs it.
Large Intestine	Removes water from unwanted food.
Rectum	Stores faeces (waste material)

Human Organs



Leaf	Traps sunlight to make food for a plant.
Stem	Carries substances around a plant.
Root	Holds the plant in place and takes in water and other substances.
Photosynthesis	The process by which a plant makes its own food.

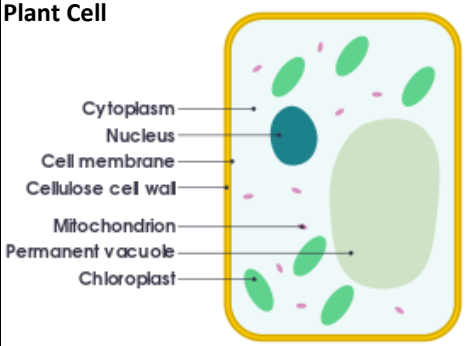
3. Tissues

Tissues	Groups of the same cells doing the same job- make up organs.
The Heart	Made up of muscle tissue so it can move and pump the blood as well as fat tissue to protect it.
Root Hair Tissue	Small hairs on the outside of roots which help to take in as much water as possible.
Xylem Tissue	The tissue which carries water up through plants from the roots.

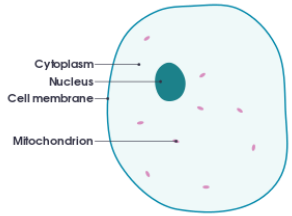
4. Cells

Cells	The basic units from which all tissues and living things are made from.
Specialised	When something has features that allow it to do a particular job.
Cell Surface Membrane	Controls what enters and leaves the cell.
Nucleus	Controls the cell.
Cytoplasm	Jelly like substance where chemical reactions happen.
Mitochondria	(*mitochondrion- singular*) Where respiration happens.
Chloroplasts	Make food for the plant using photosynthesis- contains chlorophyll.
Cell Wall	Strengthens and supports the cell- made of cellulose.
Vacuole	Storage space filled with cell sap.

Plant Cell



Animal Cell



5. Organ Systems

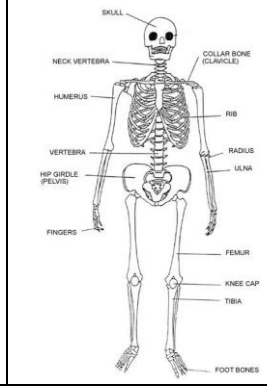
Organ Systems	A collection of organs working together.
Circulatory System	*Heart, blood vessels* Carries oxygen and nutrients around the body.
Digestive System	*Gullet, stomach, intestines* Breaks down food and takes nutrients into the blood.
Locomotor System	*Muscles, bones* Enables the body to move.
Urinary System	*Kidneys, bladder* Gets rid of waste materials produced in the body.
Breathing System	*Lungs, trachea* Allows exchange of gases between blood and lungs.
Nervous System	*Brain, nerves, spinal cord* Allows the body to sense things and react to them.
Water Transport System	*Roots, stem, leaves* Transports water around the plant.

Lesson	Memorised?
1. Life Processes	
2. Organs	
3. Tissues	
4. Cells	
5. Organ Systems	

7C Muscles and Bones

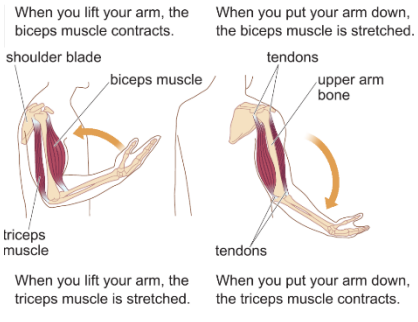
1. Muscles and Breathing	
Breathing	The movement of muscles that allows us to take in and excrete gases.
Respiration	Process by which oxygen is used to release energy- produces carbon dioxide.
Gas Exchange	One gas is exchanged for another- oxygen goes into the blood, carbon dioxide leaves the blood.
Gas Exchange System	The organs that help with breathing / gas exchange- lungs, trachea, diaphragm
Muscle Cell Adaptations	Can change shape- contract (become short and fat) and relax (back to original shape)
Inhale	Breathing in
Exhale	Breathing out
Inhalation	The muscles in the diaphragm contract, moving it downwards. Muscles between the ribs contract, pulling the ribs up and out. Lungs increase in size allowing air to flow in.
Exhalation	The muscles in the diaphragm relax so it rises. Muscles between the ribs relax, moving the ribs down and in. Lungs decrease in size pushing air out.
Ventilation	The movement of air into and out of the lungs
Breathing Rate	Number of times you inhale and exhale in one minute.

2. Muscles and Blood	
Pulse	The feeling of the heart beating that can be felt.
Pulse Rate	The number of pulse beats you feel in a minute.
How the Heart Pumps Blood	Chambers fill with blood and muscle tissue contracts pumping the blood out.
Blood Vessels	A tube that carries blood around the body.
Arteries	Carry blood away from the heart to capillaries.
Capillaries	Tiny blood vessels connecting arteries & veins.
Veins	Carry blood from capillaries towards heart.
Plasma	Main part of blood- the liquid part.
Red Blood Cells	Carry oxygen in the blood- haemoglobin in cells carries the oxygen.
Red Blood Cell Adaptations	No nucleus (more room for haemoglobin). Curved shape increases surface area to take in oxygen quickly.
White Blood Cells	Fight infections and keep us healthy.
Bone Marrow	Where red and white blood cells are made.

3. The Skeleton	
Bone Structure	Spongy bone material keeps bones light. Compact bone material is hard and strong. Bone marrow inside bone reduces mass of bone.
Skeleton	Formed by the bones in the body- allows for support, protection and movement.
Backbone	Made up of smaller vertebrae- the bodies main support.
Skull	Made up of 22 bones- protects the brain.
Tendons	Connects muscle to bones.
Ligaments	Connects bones together.
Cartilage	Slippery tissue on the ends of bones.
Flexible Joint	Two or more bones meeting that can be moved.
The Human Skeleton	

4. Muscles and Moving	
Locomotor System	The system that allows you to move parts of the body- muscles and bones.
Biomechanics	The study of how muscles and bones work together.
Movement	Muscles contract and pulls on bone it is attached to.
Antagonistic Pairs	Pairs of muscles that allow bones to move in two different directions.

Biceps and Triceps



Impulses	Messages sent from brain that tell muscles to contract.
Mitochondria	Where respiration happens in cells producing energy.

5. Drugs	
Drug	Substances which changes the way the body works.
Medicine	Drugs used to help people with illness/injury.
Side-Effects	Harmful / unpleasant effects of using drugs.
Addictive	Feeling of not being able to cope without the drug.
Recreational Drugs	Drugs taken for pleasure- caffeine nicotine and alcohol are legal recreational drugs.
Cannabis	Can cause memory loss and mental illness.
Ecstasy	Can cause mental illness, kidney damage and death.
Cocaine	Addictive and blocks arteries.
Heroin	Addictive, collapses veins, causes vomiting & headaches
Reaction Time	The time taken to respond to a stimulus.
Stimulants	Decrease your reaction time- impulse carried faster. e.g. caffeine
Depressants	Increase your reaction time- impulses carried slower. e.g. alcohol

Lesson	Memorised?
1. Muscles & Breathing	
2. Muscles & Blood	
3. The Skeleton	
4. Muscles & Moving	
5. Drugs	

7D Ecosystems

1. Variation

Habitat	The place where an organism lives.
Variation	The difference between organisms.
Continuous	Type of variation where the measurement can be any value in a given range. *e.g. height, mass*
Discontinuous	Type of variation where the measurement falls into certain categories. *e.g. eye colour, blood group*
Offspring	The new organism produced by reproduction.
Species	Group of organisms that can reproduce to produce offspring that can also reproduce.
Hybrid	The offspring of two different species. They cannot reproduce.

2. Adaptations

Environment	The conditions in a habitat.
Adaptations	Features that help an organism to survive in the environment where it lives.
Polar Bear Adaptations	• Thick fur to keep warm • small ears to stop heat loss • white fur for camouflage • rough soles to grip ice • large feed to spread out weight / swimming
Cactus Adaptations	• Stem stores water • roots cover large area to absorb water • no leaves to stop water loss
Jack Rabbit Adaptations	• large ears to allow heat to escape • large hind legs to increase running speed • gets all its water from food, doesn't drink

Community	All the animals and plants that live in a habitat.
Ecosystem	The community and all the physical environmental factors together.
Inherited Variation	Variation between features caused by an organism's DNA
Inherited Variation Between Same Species	Gametes contain different instructions for features. A different sperm and egg produce each offspring, so each has different features.
Identical Twins	Identical because they develop from one fertilised egg cell.

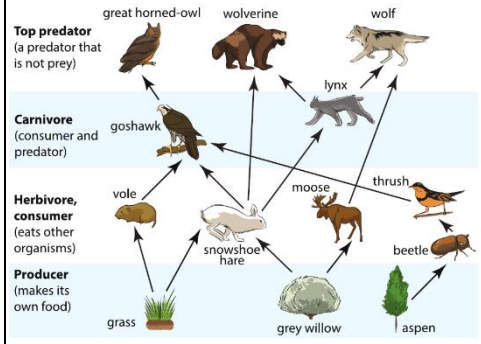
3. Effects of the Environment

Environmental Variation	Variation caused by environmental factors. *e.g. hairstyle, accent*
Daily Changes	Environmental changes during the day.
Seasonal Changes	Environmental changes during the year.
Nocturnal	Animals that are only active at night.
Nocturnal Animal Adaptations	Excellent eyesight Nocturnal owls have superb hearing as well and can fly.
Deciduous	Trees that lose their leaves in winter to stop water loss.
Evergreen	Trees with tougher leaves that don't lose much water so they keep them all year.
Hibernation	Organisms become inactive in winter so they don't need food.
Migration	Birds fly to warmer places for winter to find food.

4. Effects on the Environment

Resources	What an organism needs to survive and grow- oxygen, food, water, etc. for animals.
Population	The numbers of a specific organism.
Food Chain	Represents what eats what in a habitat Grass → hare → lynx
Competition	Organisms compete over the resources that they need.
Food Web	Formed by joining together all food chains in an ecosystem.

Food Web Example



Interdependent	Organisms in an ecosystem all depend on one another.
Predator	Eats another animal.
Prey	Eaten by another animal.

5. Transfers in Food Chains

Food Chain Arrows	Represent energy passed between organisms.
Energy Flow	Energy is lost at each stage along a food chain due to being released by respiration for movement etc. and some food remains undigested.
Pyramid of Numbers	Diagram showing number of each organism at each stage of a food chain. 
Pesticides	Poison that kills pests.
Pests	Organisms that cause problems.
Persistent	Poisons that are not broken down in nature.
Poisons in a Food Chain	Poisons get more concentrated the further along a food chain.
DDT	Persistent pesticide used in the UK that caused bird shells to become weak and break easily. Banned in 1984.

Lesson	Memorised?
1. Variation	
2. Adaptations	
3. Effects of the Environment	
4. Effects on the Environment	
5. Transfers in Food Chains	

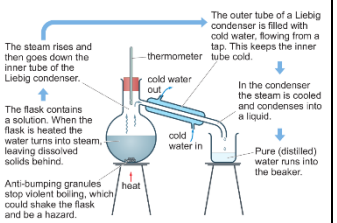
7E Mixtures and Separation

1. Mixtures	
Mixture	Two or more substances jumbled together but not joined together.
Suspension	A mixture of a solid and liquid, where the solid bits are heavy enough to settle out if the mixture is left to stand.
Colloid	A mixture of a solid, liquid or gas in a solid, liquid or gas where the substances do not settle out if left to stand.
Dispersed	Spread out without settling out, such as the bits in a colloid.
Opaque	Cannot be seen through- colloids are opaque / cloudy.
Solution	When a substance has dissolved in a liquid.
Transparent	Light can pass through and it can be seen through- solutions are transparent.
Filter	Something through which a liquid is passed to remove suspended pieces of solid.

2. Solutions	
Solvent	The liquid in which a substance dissolves to make a solution.
Solute	The substance that has dissolved in a liquid to make a solution.
Dissolve	When a substance breaks up into such tiny pieces in a liquid that it can no longer be seen and forms a solution.
Soluble	Describes a substance that can dissolve in a liquid.
Conservation of Mass	The total mass of a solution is the same as the mass of the dissolved substance plus the mass of the liquid at the start.
Saturated	A solution that contains so much dissolved solute that no more solute can dissolve in it.
Solubility	The amount of a substance that dissolves in a particular solvent at a particular temperature to make a saturated solution.

3. Evaporation	
Evaporation	When a liquid changes into a gas. Can be used to separate a liquid from the solid dissolved in it.
Sodium Chloride	The scientific name for table salt that we use on our food.
Rock Salt	When sodium chloride is found in thick layers of rock underground.
Extracting Rock Salt	Can be dug up or mined. Water can be pumped into layers of salt underground, dissolving the sodium chloride which is then pumped to the surface and heated to evaporate the water, leaving behind sodium chloride.
Boiling	When there is liquid turning into a gas in all parts of a liquid- creates bubbles of gas in the liquid.
Boiling Point	The temperature at which a liquid boils.

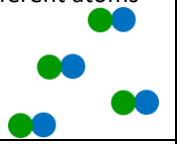
4. Chromatography	
Chromatography	Used to separate substances dissolved in a mixture.
Paper Chromatography	A concentrated dot of a mixtures is placed at the bottom of special chromatography paper. The bottom of the paper is dipped into a solvent (such as water). As the solvent moves up the paper is carries the dissolved substances.
Concentrated	A solution that contains a large amount of solute dissolved in a small amount of solvent.
Chromatogram	The results of chromatography such as a dried piece of paper for paper chromatography showing when the dissolved solids have been separated.
How chromatography works	Different substances in a mixture are carried at different speeds, depending on how soluble they are, which separates them out from each other.

5. Distillation	
Desalination	Separating water from the salts in salty/sea water to produce fresh drinking water.
Distillation	The process of separating a liquid from a mixture by evaporating the liquid and then condensing it to be collected.
Steam	Water as a gas.
Condenses	When a substance changes from its gas state into its liquid state.
Pure	A single substance that does not have anything else in it. (Pure water only contains water and no dissolved solutes)
Distillation Apparatus	
Solar Still	Energy from the Sun is used to evaporate salty/dirty water which is then condensed, forming pure/clean water.

Lesson	Memorised?
1. Mixtures	
2. Solutions	
3. Evaporation	
4. Chromatography	
5. Distillation	

7H Atoms, Elements and Molecules

1. The Air We Breathe

Particles	Tiny pieces of matter that make up everything.
Atoms	The simplest particles of matter that make up everything.
Elements	A substance made up of one type of atom. 
Molecules	Two or more atoms joined together in a group. 
Compound	Two or more different atoms joined together. 
Mixture	Two or more substances jumbled together but not chemically joined together. 
Periodic Table	A table that lists all of the known elements.
Air	A mixture of different gases- nitrogen, oxygen, argon, carbon dioxide
Pure	A substance made up of a single element/compound and nothing else.

2. Earth's Elements

Chemical Symbols	The 1 or 2 letters given to each element
Earth's Crust	Made up of oxygen, iron, silicon, aluminium, calcium and other elements.
Naturally Occurring Elements	Usually found as compounds, some found pure. Can be extracted from compounds by simple chemical reactions.
Properties	What an element is like, its appearance and how it behaves.
Recycling	Using a material again to save resources and make sure we don't run out.
Carbon	Can be found as diamond and graphite. The different properties of each form are due to the ways the atoms are joined together.

3. Metals and Non-Metals

Common Metal Properties	Solid, high melting point, strong, flexible, malleable, shiny and good conductors of heat and electricity.
Metals	Three-quarters of all elements are metals- found on the left side of the periodic table.
Common Non-Metal Properties	Low melting points, brittle, not shiny and poor conductors of heat and electricity.
Malleable	Able to be beaten and bent into shape.
Flexible	Able to bend without breaking.
Conductor	A substance that allows something to pass through it (e.g. heat, electricity).
Brittle	Not easily bent- breaks under pressure.
Magnetic	Iron, nickel and cobalt are the only magnetic elements.
Mercury	The only metal that is liquid at room temperature.

4. Making Compounds

Silicon Dioxide	The most common compound in the Earth's crust- found in sand, quartz and granite.
Forming Compounds	The first stage often involves heating a mixture of elements. Energy is often given out when elements react to form compounds.
Iron Sulfide	Compound formed by heating a mixture of iron and sulfur.
Bonds	Formed between atoms when compounds are formed.
Iron Sulfide Properties	Iron can be separated from sulfur using a magnet but iron sulfide is not magnetic.
Metal Ores	A rock containing a compound of a metal.
Naming Compounds	If one of the elements in the compound is a metal its name goes first. the non-metal at the end of the compound's name has its name changed so it sends in -ide.

5. Chemical Reactions

Chemical Reaction	A change in which one or more new substance is formed.
Word Equation	Used to model chemical reactions.
Reactants	The starting substances- written on left of word equation.
Products	The new substances made- written on right of word equation.
Thermal Decomposition	Using heat to break down a compound- used to extract metals from their compounds.
Thermal Decomposition of Mercury Oxide Mercury oxide → mercury + oxygen	
Carbonates	Compounds containing a metal, carbon and oxygen.
Calcium Carbonate	Found in limestone, chalk and marble.
Thermal Decomposition of Calcium Carbonate Copper carbonate → copper oxide + carbon dioxide	
Test for Carbon Dioxide	Carbon dioxide turns limewater cloudy.
-ate	A compound that contains two elements plus oxygen will end in -ate. (e.g. zinc sulfate contains zinc, sulfur and oxygen)

Lesson	Memorised?
1. The Air We Breathe	
2. Earth's Elements	
3. Metals and Non-Metals	
4. Making Compounds	
5. Chemical Reactions	

7I Energy

1. Energy from Food	
Energy	Needed to live, helps us to grow and repair our bodies, move and keep warm. Food is a source of energy.
Joule	A unit for measuring energy.
Kilojoule	1000J = 1kJ
Diet	The food that a person eats.
Weight	The amount of force with which gravity pulls things- measured in Newtons (N).
Balanced Diet	Eating a variety of foods to provide all the things that the body needs.
Nutrients	Substances needed from food.

2. Energy Stores and Transfers	
Transferred	When energy is moved from one store into another.
Forces	A push, pull or twist and a type of energy transfer.
Electricity	A way of transferring energy through wires.
Other Energy Transfers	By heating, sound and light.
Stored	When energy is captured within an object and can be moved to another store by energy transfers.
Chemical Energy	Energy stored in chemicals (such as food, fuel and batteries).
Kinetic Energy	Energy stored in moving things.
Thermal Energy	Energy stored in hot objects.
Strain Energy	Energy stored in stretched or squashed objects. Also called elastic potential energy.
Gravitational Potential Energy	Energy stored in objects in high places that can fall down.
Nuclear Energy	Energy stored inside materials (also called atomic energy).
Law of Conservation of Energy	The idea that energy can never be created or destroyed, only transferred from one store to another.

3. Fuels	
Fuel	A substance that contains a store of chemical or nuclear energy that can easily be transferred.
Nuclear Fuels	Used in nuclear power stations to generate electricity.
Uranium	A radioactive metal that can be used as a nuclear fuel.
Generate	To produce electricity.
Fossil Fuels	A fuel formed from the dead remains of organisms over millions of years.
Coal	A fossil fuel made from the remains of plants.
Oil	A fossil fuel made from the remains of microscopic dead plants and animals that lived in the sea.
Natural Gas	A fossil fuel made from the remains of microscopic dead plants and animals that lived in the sea.
Non-Renewable	An energy resource that will run out because we cannot renew our supplies of it.
Renewable	An energy resource that will never run out (such as solar power)
Biofuels	A fuel made from plants or animal droppings.
Hydrogen	Can be used as a fuel by combining with oxygen from the air to produce electricity.

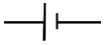
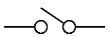
4. Other Energy Resources	
Solar Power	Generating electricity using energy from the Sun.
Solar Panel	Flat plats that use energy from the Sun to heat water.
Solar Cell	Flat panels that use energy transferred by light from the Sun to produce electricity.
Solar Power Station	A large power station using the Sun to heat water to make steam which then generates electricity.
Wind Turbine	Generates electricity using energy transferred from the wind.
Hydroelectric Power	Electricity generated by moving water turning turbines and generators.
Geothermal Power	Electricity generated using heat from rocks underground.
Photosynthesis	Carbon dioxide + water → glucose + oxygen

5. Using Resources	
Fossil Fuel Advantages	Cheap compared to the others and convenient to use in cars/vehicles.
Fossil Fuel Disadvantages	Non-renewable Releases polluting gases when burnt.
Nuclear Advantages	No polluting gases generated.
Nuclear Disadvantages	Non-renewable Very expensive Dangerous waste materials
Renewable Advantages	No polluting gases Renewable
Renewable Disadvantages	Most not available all the time and only available in specific locations.
Climate Change	Fossil fuels are making the earth warmer due to the carbon dioxide given off when they are burnt.
Efficiency	How much of the energy transferred by a machine is useful.
Using Less Fossil Fuels	Using efficient appliances, insulating homes, public transport/walking/cycling

Lesson	Memorised?
1. Energy from Food	
2. Energy Stores and Transfers	
3. Fuels	
4. Other Energy Resources	
5. Using Resources	

7J Current Electricity

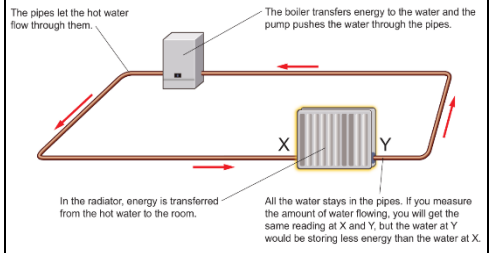
1. Switches and Current

Component	Something in a circuit.
Switch	Closing a switch completes the circuit allowing the current to flow.
Bulbs	Electricity flowing through makes the filament glow.
Current	The amount of electricity flowing around a circuit. Measured in amperes (A).
Current in a Series Circuit	Current is not used up as it goes around the circuit, it is the same everywhere.
Ammeter	Used to measure current.
	Cell circuit symbol
	Bulb circuit symbol
	Switch circuit symbol
	Ammeter circuit symbol

2. Models for Circuits

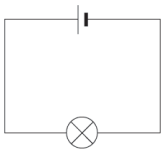
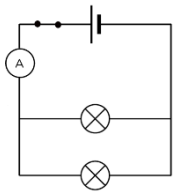
Models	A way of showing or representing something.
Advantages of Using Models	Allow us to help think about complicated ideas in science.
Charges	An electric current is a flow of charges carrying energy from the cells to the components.
Conductors	Charges can move through them easily (e.g. metals).
Insulators	Charges cannot move through them easily.

Model Example

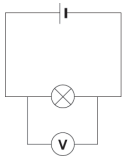
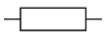
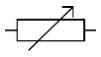


Model Example Explanation	•Boiler represents the cell •Pipes represent the wires •The radiator represents a component •Water represents the current

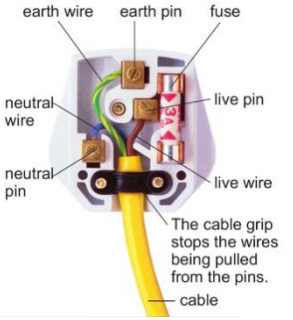
3. Series and Parallel Circuits

Series Circuit	A circuit with all the components in one loop.
Series Circuit Diagram	
Parallel Circuit	A circuit with branches that split apart and join again.
Parallel Circuit Diagram	
Parallel Circuit Advantages	Each bulb/component can be turned on individually. If one bulb/component breaks the components in other branches stay on (unlike a series circuit).
Current in a Parallel Circuit	The current splits when it reaches a branch. The current in all the branches add up to the current in the main part of the circuit.
Adding Bulbs	If you add bulbs into a series circuit the current gets smaller and the bulbs dimmer. In a parallel circuit if you add bulbs on different branches they stay bright.

4. Changing the Current

Voltage	A way of saying how much energy is transferred by electricity. The voltage of the cell helps push the charges around the circuit. Measured in volts (V).
Voltmeter	Used to measure voltage.
Connecting a Voltmeter	Voltmeters are connected across a component. 
Voltage in a Series Circuit	The voltage across all the components adds up the voltage across the cell.
Resistance	How difficult it is for electricity to flow through something.
Resistor	A component that makes it difficult for electricity to flow- reduces size of current.
	Voltmeter circuit symbol
	Resistor circuit symbol
	Variable resistor circuit symbol

5. Using Electricity

Hazard	Something that could cause harm.
Risk	The chance that a hazard will cause harm.
Electricity Risks	Can cause fires, burns to the body and stop the heart from working.
Reducing Risks	Don't touch bare metal parts of plugs, don't poke things into sockets, keep water away from electricity, don't plug too many things into a socket and never use a damaged wire.
Fuse	A wire that melts if the current is too high, breaking the circuit.
Circuit Breaker	Cuts off the current if it is too high.
Plug Wires	**Live** and **neutral** wires make an appliance work; **earth** wire is for safety.
Plug Diagram	

Lesson	Memorised?
1. Switches and Current	
2. Models for Circuits	
3. Series and Parallel Circuits	
4. Changing the Current	
5. Using Electricity	

7L Sound

1. Making Sounds

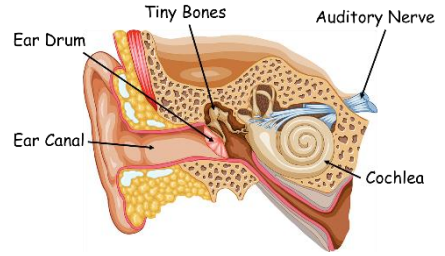
Making Sounds	Sounds are made by something vibrating.
Intensity	How loud or soft a sound is- its volume.
Pitch	How high or low a sound is.
Frequency	The number of vibrations each second. The higher the frequency the higher the pitch.
Hertz (Hz)	The units for measuring frequency.
Amplitude	The size of vibrations. The bigger the amplitude the louder the note.
Humans Making Sounds	Two flaps (vocal folds) across the windpipe vibrate when air moves across them.
Grasshoppers Making Sounds	Male grasshoppers chirp by rubbing one leg against a wing.
Gorillas Making Sounds	Male gorillas thump their chests or thump the ground to threaten other males.

2. Moving Sounds

Moving Sounds	Sounds can only travel through a medium (a solid, liquid or gas).
Vacuum	A completely empty space. Sound cannot travel through.
Particles	Tiny pieces of matter that make up everything.
Sound Moving Through the Air	Air particles vibrate and cause nearby particles to vibrate so the vibrations spread through the air.
Sound Wave	Formed by the moving vibrations.
Pressure Wave	The air particles are pushed together in some place (high pressure) and spread out in other places
Sound Wave Frequency	The number of waves passing a point per second.
Sound Wave Amplitude	The distance moved by air particles as the sound wave passes.
Energy	Energy is transferred from one place to another by sound waves. They do not transfer particles.
Speed of Sound	Sound travels faster in solids because the particles are close together.
Moving Away from A Source	As you move away from a source of sound, the energy carried has spread out further so there is less energy for your ear to detect- it sounds quieter.

3. Detecting Sounds

The Ear

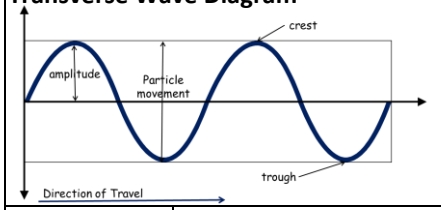
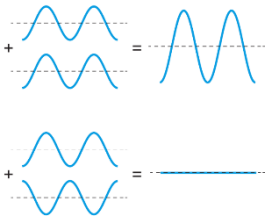


Ear Protection	Loud sounds damage our ears- people who work in noisy surroundings need ear protection. Certain soft materials (carpets, curtains, etc.) also absorb energy transferred by sound waves.
How Ears Detect Sounds	1. sound waves enter the ear canal. 2. the eardrum (a thin membrane) vibrates. 3. vibrations pass to the tiny bones which amplify the vibrations. 4. vibrations pass to the liquid inside the cochlea. 5. tiny hairs inside the cochlea detect vibrations and create electrical signals (impulses). 6. impulses travel along the auditory nerve to the brain.
How Microphones Detect Sounds	Sounds make a thin sheet of materials (a diaphragm) vibrate and electrical circuits convert these vibrations into electrical currents.
Decibels (dB)	The units for measuring the loudness of a sound.
Auditory Range	The range of frequencies an organism can hear 20Hz – 20000Hz in humans
Infrasound	Sounds below 20Hz
Ultrasound	Sounds above 20000Hz

4. Using Sound

Using Sound	Sound is often used for communication.
Transmitted	Energy from sound waves goes through some materials.
Reflected	Energy from sound waves bounces off some materials.
Using High Frequency Waves	• Treat injuries • Clean delicate objects by making tiny bubbles that loosen dirt when the burst.
Echo	A reflected sound
Echolocation	Used by animals (bats, dolphins, etc.) to find their way around/find prey.
Sonar	Pulse of ultrasound is given off and reflected by the sea bed. It is then detected by sonar equipment to find the depth.

5. Comparing Waves

Longitudinal Waves	Particles vibrate in same direction wave is moving.
Transverse Waves	Particles vibrate at right angles to direction wave is moving.
Transverse Wave Diagram	
Superposition	As waves pass through each other their effects add up or cancel out.
Superposition Diagram	

Lesson	Memorised?
1. Making Sounds	
2. Moving Sounds	
3. Detecting Sounds	
4. Using Sound	
5. Comparing Waves	

8B Plants and their Reproduction

1. Classification and Biodiversity

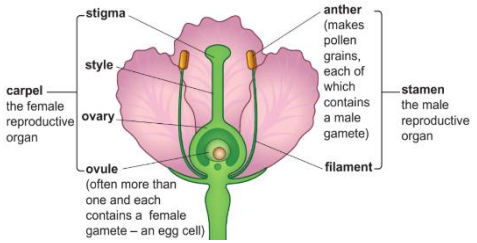
Classification	Sorting organisms into groups based on their characteristics.
Kingdoms	The five largest groups (each can be split into smaller groups)- *animals, fungi, protoctists, prokaryotes and plants*.
Plants	Members of the plant kingdom have cellulose cell walls, are multicellular and make their own food.
Scientific Name	We give organisms scientific names using the names of the last two groups- the genus and the species.
Scientific Name Advantages	Scientific names are agreed around the world so there is no confusion. Some species have the same common name in different places.
Biodiversity	The number of difference species in an area.
Advantages of High Biodiversity	Recover faster from disasters and useful substances can be found (medicines).
Extinct	When an organism dies out completely.

2. Types of Reproduction

Sexual Reproduction	Two organisms breeding to produce offspring.
Hybrids	The offspring of two different species- they are not fertile.
Fertile	Can produce offspring.
Inherited Variation	Characteristics inherited from parents (due to DNA).
Gametes	Sex cells
Zygote	The fertilised egg cell formed when the male and female gamete join.
Asexual Reproduction	Reproduction involving only one parent- produces offspring identical to the parent (clones).
Runners	An example of asexual reproduction used by strawberry plants. They spread over the ground and sprout roots to grow new identical plants.
Tubers	An example of asexual reproduction used by potato plants. They are underground stems (potatoes) that contain a store of food that can grow into a new plant.
Using Asexual Reproduction	Gardeners take cuttings of leaves/stems to grow new plants quickly and cheaply.

3. Pollination

Plant Reproductive System



Pollen	Male gamete that ripens inside the anthers.
Pollination	The pollen grain carried away and transferred to the stigmas of another plant can be by animals/wind/water/
Plant Adaptations for Animal Pollination	Brightly coloured petals, nice scent and nectar attract animals (mainly insects). The structure also makes it easier for animals to pick up / leave pollen grains.
Plant Adaptations for Wind Pollination	Pollen is smooth and light to float through air. large anthers and stigmas hang outside the flower to catch the wind.
Self-Pollination	Pollen grains from a plant land on the stigma of the same plant.
Cross-Pollination	Pollen transferred from one plant to another.

4. Fertilisation and Dispersal

Pollen Tube	Formed when a pollen grain reaches a stigma of the same species. It grows down to the ovule.
Fertilisation	The egg cell and the male gamete from the pollen grain join together to form a zygote.
Cell Division	The process by which the cell splits into two.
Embryo	Formed when the cells divide again and again.
Seed	The ovule becomes a seed. Inside the seed is the embryo and a food source.
Seed Coat	Hart outer coating of seed to protect it.
Germinate	The seed starts to grow.
Fruit	The ovary swells up and forms the fruit around the seed.
Seed Dispersal	The spreading of seeds away from the parent plant.
Attracting Animals	Fruits are fleshy, soft, juicy and taste good to attract animals for seed dispersal.
Egested	Seeds are passed out by animals in their faeces.
Other Seed Dispersal Methods	Wind, water and explosions- useful so that new plants aren't in competition with the parent plant.

5. Germination and Growth

Resources	What a plant needs to grow/germinate.
Respiration	The process of releasing energy from glucose.
Respiration Word Equation	glucose + oxygen → carbon dioxide + water
Dormant	Slow life processes but still alive- such as in a seed.
Photosynthesis	A process that plants use to make their own food.
Photosynthesis Word Equation	carbon dioxide + water ⟶ glucose + oxygen
Starch	Glucose is converted to starch to store it.
Chloroplasts	Traps light energy needed for photosynthesis.
Interdependent	Organisms that depend on one another.

Lesson	Memorised?
1. Classification & Biodiversity	
2. Types of Reproduction	
3. Pollination	
4. Fertilisation & Dispersal	
5. Germination & Growth	

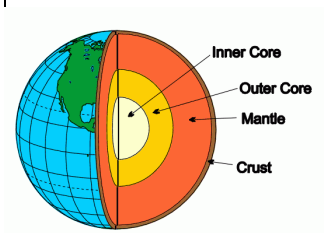
8H Rocks

1. Rocks and Their Uses

Geologist	A scientist who studies rocks and the Earth.
Rocks	Naturally occurring substances made up of different grains.
Grains	Made from one or more chemical compounds.
Minerals	The chemical compounds in rocks- rocks are mixtures of different minerals.
Texture	The combination of sizes and shapes of grains in a rock.
Interlocking Crystals	The grains all fit together with no gaps. They are hard and do not wear away easily.
Rounded Grains	Some rocks have rounded grains with gaps in between. They are not strong and can be worn away more easily.
Porous	Rounded grain rocks can absorb water because it gets into the gaps.
Permeable	Water can run through.
Cement	A building material made from limestone.
Gravel	A mixture of cement, sand and gravel.

2. Igneous and Metamorphic

The Structure of the Earth



Igneous Rocks	Formed when molten rock cools down *e.g. basalt, granite*
Magma	Molten rock
Lava	Magma that reaches the Earth's surface.
Small Crystals	Formed when molten rock cools down fast due to less time for particles to become ordered.
Large Crystals	Formed when molten rock cools down slowly due to more time for a large grid pattern to form.
Extrusive	Igneous rocks formed from cooling lava above the surface.
Intrusive	Igneous rocks formed underground.
Metamorphic Rocks	Formed by pressure and heat changing other rocks. *e.g. Schist, gneiss (both formed from granite) slate (from mudstone) and marble (from limestone)*
Metamorphic Rock Texture	Always made from interlocking crystals which may form coloured bands.

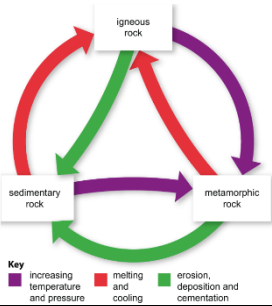
3. Weathering and Erosion

Weathering	When rocks are broken up by physical, chemical or biological processes.
Chemical Weathering	When rocks are broken up by chemical reactions. *e.g. gases in air making rainwater slightly acidic which then reacts with minerals in rock wearing them away.*
Biological Weathering	When rocks are broken up by living organisms. *e.g. growing plants splitting rocks apart with their roots.*
Physical Weathering	When rocks are broken up by physical processes. *e.g. changes in temperature causing expansion and contraction over time, cracking rocks.*
Expanding	Rocks get bigger when they are heated.
Contracting	Rocks get smaller when they are cooled.
Freeze-Thaw Action	Water gets into cracks in rocks, freezes, expands and then forces the crack to get bigger.
Erosion	The movement of loose and weathered rock.
Abrasion	When rock fragments bump into each other and are worn away.
Sediment	Bits of rock and sand in streams or rivers.
Glacier	Rivers of ice that move slowly but can transport large pieces of rock.

4. Sedimentary Rocks

Sedimentary Rocks	Formed when layers of sediment build up over time followed by compaction then cementation. *e.g. sandstone, mudstone*
Compaction	Pressure forces water out from the gaps between grains squashing the grains closer together.
Cementation	Dissolved minerals between the gaps act as a glue and 'cement' the grains together.
Sedimentary Rock Texture	They are always made from rounded grains. Properties depend on the type of sediment that forms them.

The Rock Cycle



5. Materials in the Earth

Native State	Metals found as pure elements in rocks.
Ores	Rocks that contain enough of a metal / metal compound to be worth mining.
Extracting Ores	Ores are obtained by mining, then crushed and chemical reactions used to obtain the metal.
Mining Problems	Damages the environment by destroying habitats and causes pollution.
Rare Metals	Hard to obtain which makes them expensive.
Recycling	Using a material again.
Recycling Advantages	Cuts down on pollution from mining and landfill sites, allows supplies to last longer and requires less energy.

Lesson	Memorised?
1. Rocks and their Uses	
2. Igneous and Metamorphic	
3. Weathering and Erosion	
4. Sedimentary Rocks	
5. Materials in the Earth	