Science Knowledge Organisers

Year 7 PC2 (February 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

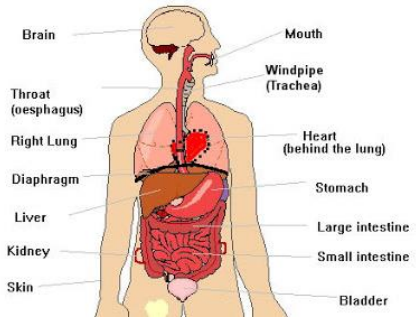
1. Life Processes

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.

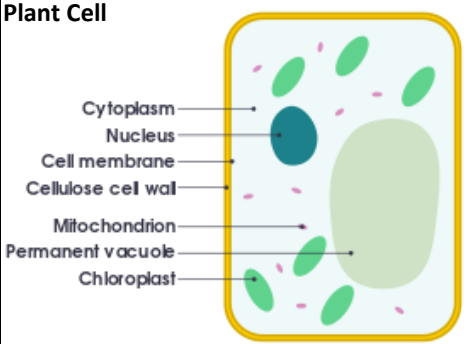
3. Tissues

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.

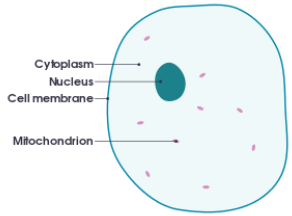
4. Cells

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	

7B Sexual Reproduction in Animals

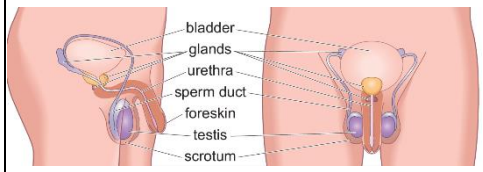
1. Animal Sexual Reproduction

Offspring	The new organisms produced by reproduction.
Sexual Reproduction	Reproduction that needs two parents to produce offspring.
Gametes	Sex cells
Sperm	Gamete that males make
Egg	Gamete that females make
Fertilisation	Sperm enters an egg cell and nuclei fuse forming a fertilised egg cell.
External Fertilisation	The sperm and egg cell meet outside of the body. e.g. fish
Internal Fertilisation	The sperm and egg cell meet inside the body.
Using External Fertilisation	Large numbers of eggs are produced because many get washed away. The parents don't look after their young.
Using Internal Fertilisation	Fewer egg cells produced because sperm is more likely to reach egg. The parents usually look after their young.

2. Reproductive Organs

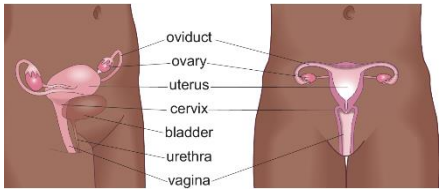
Testes	Where sperm cells are made.
Scrotum	Bag of skin containing the testes.
Sperm Ducts	Sperm travels through here after leaving the testes.
Glands	Fluids are added to the sperm- it is now called semen.
Urethra	The tube the semen leaves the body through.

Male Reproductive System



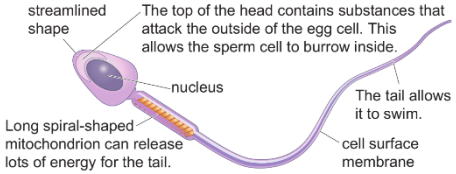
Ovary	Where the egg cells develop and are released from.
Oviduct	Tube lined with cilia (tiny hairs).
Uterus	Where the baby will develop if the egg is fertilised.
Cervix	Ring of muscle between uterus and vagina.
Vagina	Part that leads from the cervix to the outside.

Female Reproductive System

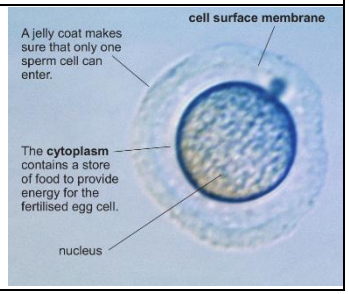


Puberty	When males start to produce sperm cells and egg cells in female start to mature.

Sperm Cell Adaptations



Egg Cell Adaptations



3. Becoming Pregnant

Sexual Intercourse	The erect penis is inserted into the vagina.
Ejaculation	Semen is pumped out of the urethra.
Route the sperm takes	Vagina → sucked up through cervix → uterus → oviduct → meets egg cell
Implantation	If fertilisation occurs the cell starts to divide forming an embryo which will then sink into the uterus lining. The woman is now pregnant.
Amniotic Fluid	Watery fluid to protect growing embryo / foetus.
Amnion	Bag containing the amniotic fluid.
Placenta	Allows oxygen, food and water to be passed from mother's blood into embryo's blood. Waste materials (like carbon dioxide) pass from embryo's blood into mother's blood.
Umbilical Cord	Carries the embryo's blood to and from the placenta.

4. Gestation and Birth

Gestation Period	The time from fertilisation until birth.
Foetus	When an embryo develops a full set of organs we call it a foetus (around 8 weeks).
Ultrasound Scans	Produce images of foetus to check for problems.
Harm to Baby	Alcohol, drugs, cigarette smoke and viruses can pass through placenta and harm foetus.
Premature	Baby born small and early.
Labour	The act of giving birth.
Stages of Giving Birth	1. contractions start and cervix begins to widen. 2. amnion breaks and amniotic fluid leaves vagina. 3. cervix at 10cm, stronger contractions pushes baby through. 4. Umbilical cord cut.
Afterbirth	The placenta is passed out of the vagina- end of labour.
Mammary Glands	Produces milk for babies- contains nutrients and antibodies to protect from disease

5. Growing Up

Sex Hormones	Released by brain, tests & ovaries- start puberty.
Changes to Boys During Puberty	Voice deepens, shoulders widen, hair grows, testes/ penis grow, sperm produced.
Changes to Girls During Puberty	Breasts develop, hair grows, hips widen, ovaries start to release eggs.
Menstrual Cycle	Days 1-5: uterus lining lost from body (**menstruation**) Days 6-14: egg cell starts to mature and is released around day 14 (**ovulation**) Days 14+: egg cell swept towards uterus, if not fertilised cycle starts again.

Lesson	Memorised?
1. Animal Sexual Reproduction	
2. Reproductive Organs	
3. Becoming Pregnant	
4. Gestation & Birth	
5. Growing Up	

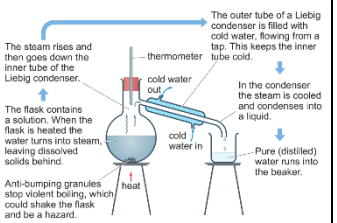
7E Mixtures and Separation

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	

7F Acids and Alkalis

1. Hazards

Hazard	Something that could cause harm.
Risk	The chance that a hazard will cause harm.
Hazard Symbols	Internationally agreed symbols representing the type of risk from using a substance.
	**Dangerous to Environment** Can cause long term damage to animal and plant life.
	**Toxic** Poisonous and can cause death if taken into the body.
	**Corrosive** Attacks certain substances like metals, stonework & skin.
	**Explosive** Heating may cause an explosion.
	**Flammable** These substances catch fire easily.
	**Caution** similar to toxic/corrosive but less serious- may cause skin irritation
Diluted	Dangerous substances are mixed with water to make them less dangerous.

2. Indicators

Indicator	A substance that changes colour in solutions of different acidity/alkalinity.
Litmus	An indicator made from a type of lichen.
Acid	Turns litmus indicator **red**.
Alkali	Turns litmus indicator **blue**.
Neutral	A substance that is neither acidic or alkaline.
Red Cabbage	Can be used as an indicator.

3. Acidity and Alkalinity

pH Scale	A scale measuring acidity and alkalinity in numbers.

The pH Scale

Acid	pH lower than 7- the lower the number the more acidic.
Neutral	pH of 7
Alkali	pH higher than 7- the higher the number the more alkaline.
Universal Indicator	Indicator that gives a range of colours depending on the pH.
Acid Rain	Rainwater more acidic than usual due to pollution.

4. Neutralisation

Neutralisation	A reaction where an acid and alkali are mixed together forming a neutral substance.
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.
Neutralisation General Word Equation Acid + alkali → salt + water	
Neutralisation Word Equation Example Hydrochloric acid + sodium hydroxide → sodium chloride + water	
Salts	Formed when acids and alkalis react. Different acids and alkalis will form different salts.
Sodium Chloride	The chemical name for common/table salt.

5. Neutralisation in Daily Life

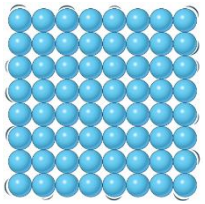
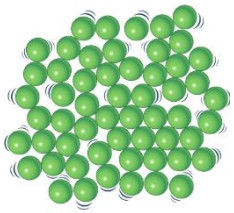
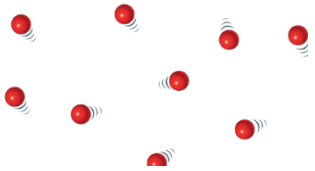
Base	Any substance that neutralises an acid forming a salt and water.
Alkali	A soluble base
Antacids	Remedy for indigestion that neutralise the stomach acid
Antacid Word Equation Example Magnesium hydroxide + hydrochloric acid → magnesium chloride + water	
Toothpaste	Contains bases that neutralise acids in your mouth from food that you eat.
Bee Sting Remedy	A bee sting, being acidic can be treated with a weak alkali like baking soda.
Wasp Sting Remedy	A wasp sting, being alkali, can be treated with a weak acid like vinegar.
Cleaning Metals	Acids clean the rust off metals using a neutralisation reaction.
Waste Gases	Acidic waste gases from industries are sprayed with calcium hydroxide to neutralise them.

Lesson	Memorised?
1. Hazards	
2. Indicators	
3. Acidity & Alkalinity	
4. Neutralisation	
5. Neutralisation in Daily Life	

7G The Particle Model

1. Solids, Liquids and Gases	
States of Matter	The three forms that a substance can be in; solid, liquid or gas.
Solid Properties	Do not flow Fixed shape Fixed volume Cannot be compressed
Liquid Properties	Can Flow No fixed shape Fixed volume Cannot be compressed
Gas Properties	Can flow No fixed shape No fixed volume Can be compressed
Flow	To move and change shape smoothly.
Volume	The amount room something takes up. Measured in cubic centimetres (cm^3).
Compressed	Squashed into a smaller volume.
Pressure	The amount of force pushing on a certain area.

2. Particles	
Particle Theory	A theory used to explain the different properties and observations of solids, liquids and gases.
Particles	Tiny pieces of matter that everything is made out of.
Forces	Tiny forces of attraction hold the particles together.

Solid Particle Properties	Fixed arrangement of particles held closely together that cannot move over each other but vibrate.
Liquid Particle Properties	Held closely together but not in a fixed arrangement and can move over each other.
Gas Particle Properties	Far apart from each other and free to move about in all directions.
Solid Particle Diagram	
Liquid Particle Diagram	
Gas Particle Diagram	
Vibrate	To move backwards and forwards.

3. Brownian Motion	
Brownian Motion	An erratic movement of small specks of matter caused by being hit by the moving particles that make up liquids or gases.
Trace	Used to plot the movement of a particle and used as evidence for Brownian motion.
Molecule	Two or more atoms joined together in a group.
Nanometre	A unit of measurement. 1 nanometre (nm) is 0.000 000 001 metres (m)

4. Diffusion	
Diffusion	The movement of particles spreading out and mixing with each other without anything moving them.
Particle Theory and Diffusion	Occurs quickly in gases because they are able to move freely in all directions. Diffusion is slower in liquids because the particles are still moving but not as freely as in a gas. Diffusion cannot occur in solids because the particles are in a fixed positon.
Small Intestine	Diffusion of particles of essential substances in our food pass through the wall of the small intestine.

5. Air Pressure	
Air Pressure	The force on a certain area caused by air molecules hitting it.
High Air Pressure	Makes sure tyres are inflated. Can also affect the weather making it dry and settled.
Vacuum	A completely empty space containing no particles (not even air).
Straws	Straws work because when you suck, you reduce the pressure inside the straw so the air pressure outside the straw is grater and the liquid is pushed up.

Lesson	Memorised?
1. Solids, Liquids and Gases	
2. Particles	
3. Brownian Motion	
4. Diffusion	
5. Air Pressure	

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

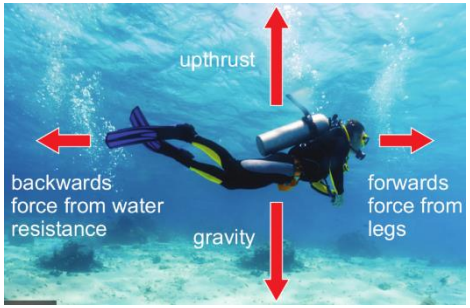
Lesson	Memorised?
1. Energy from Food	
2. Energy Stores and Transfers	
3. Fuels	
4. Other Energy Resources	
5. Using Resources	

7K Forces

1. Different Forces

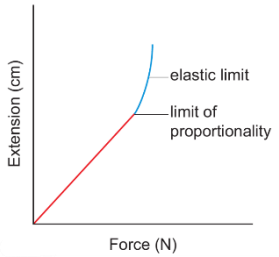
Force	A push or a pull.
Contact Forces	The thing providing the force needs to touch an object to affect it. *Friction, air resistance, water resistance, upthrust*
Upthrust	The force that makes things float.
Air Resistance	A force acting on objects moving through the air.
Water Resistance	A force acting on objects moving through water.
Non-Contact Forces	Forces that can affect an object from a distance. *Gravity, static electricity, magnetism*
Gravity	A force that pulls objects downwards.
Static Electricity	A force that attracts things.
Magnetism	A force that attracts objects made of iron, nickel or cobalt.
Newton (N)	The units for measuring forces.
Weight	The force of gravity pulling on something- measured in Newtons (N)
Mass	The amount of matter that makes up something- measured in kilograms (kg)
Representing Forces	We draw arrows on force diagrams to show the direction of a force; a bigger arrow shows a bigger force.

Force Diagram



2. Springs

Stretched	Made longer
Compressed	Made shorter
Spring	Made from coils of wire,
Extension	The difference between the original length and the stretched length.
Elastic	An object that returns to its original length when the force is removed.
Investigating Extension	Hang a spring from a clamp and measure its length. Add increasing numbers of masses and measure the extension each time.
Hooke's Law	Extension is proportional to the force applied.
Proportional	A relationship between two variables where if one doubles, the other will double.
Limit of Proportionality	The point at which the extension and force are no longer proportional.
Elastic Limit	The point at which the spring cannot return to its original length.
Force Meter	Springs are used inside to measure the force.

How Extension Depends on Force	

3. Friction

Friction	Force between two touching objects.
Increasing Friction	Using certain materials like rubber (used on racing cars to stop them from sliding off the road).
Reducing Friction	Make surfaces smooth or by using lubricants such as oil or grease.
Lubrication	Adding a lubricant
Friction Damage	Friction can wear things away like brake pads on a bike. Friction between parts of a car can cause it to overheat and stop working.

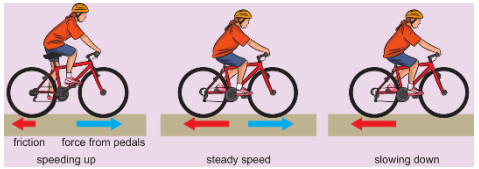
4. Pressure

Pressure	The amount of force pushing on a certain area.
The Size of Pressure	Depends upon the size of the force and the size of the area it is pushing on.
Pressure in Sport	Snowshoes spread out weight, reduce pressure and stop people sinking into soft snow.
Pressure in Everyday Life	It is easier to cut something with a sharp knife because it has a smaller edge so the force is concentrated over a smaller area.
Pressure formula	$\text{pressure} = \frac{\text{force}}{\text{area}}$
Pascal (Pa)	The units for measuring pressure. $1Pa = 1N/m^3$

5. Balanced and Unbalanced Forces

Balanced Forces	Two forces of the same size acting upon an object in opposite directions. Balanced forces will not change the speed of a moving object.
Unbalanced Forces	When one of the forces acting upon an object is larger than the other. If acting on a moving object unbalanced forces will change its speed.
Stationary	Not moving- stationary objects have balanced forces acting on them.

Force Diagram



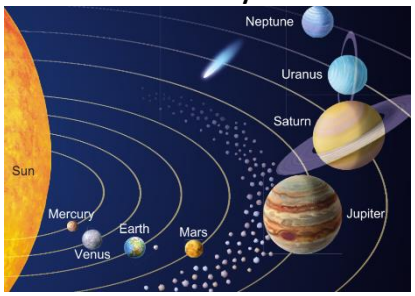
Lesson	Memorised?
1. Different Forces	
2. Springs	
3. Friction	
4. Pressure	
5. Balanced and Unbalanced Forces	

8L Earth and Space

1. Gathering the Evidence

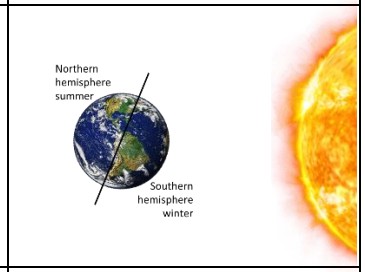
Astronomer	A scientist that studies space.
Early Astronomers	Could only use their eyes to make observations.
Ptolemy	Egyptian astronomer (*90-168*) Proposed a model with the Earth in the centre and the Moon, Sun and planets orbiting the Earth.
Nicolaus Copernicus	Polish astronomer (*1473-1543*) Suggested the Earth and other planets move in circles around (orbit) the Sun.
Reaction to Copernicus' Model	It was not accepted straight away. However observation made by Galileo using one of the first telescopes provided more evidence to support it.
Johannes Kepler	German astronomer (*1571-1630*) Proposed the model used today. The Sun is at the centre with the planets moving around in elliptical orbits. Moons orbit planets.

The Model of the Solar System

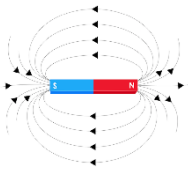


Phases of the Moon	The Moon appears different shapes at different times due to its position relative to the Earth and Sun. 
Spacecraft	Allowed scientists to investigate space more by collecting samples and taking readings on other planets.

2. Seasons

Summer	Longer days than nights, Sun high in the sky.
Winter	Longer nights than days, Sun not very high in the sky.
Cause of Seasons	Due to the tilt of the Earth's axis by 23.5°.
Causing Summer	When the northern hemisphere is tilted towards the Sun it is summer in the UK.
Causing Winter	When the northern hemisphere is tilted away from the Sun it is winter in the UK.
Causing Seasons Diagram	
Summer Sun	Because the Sun is higher in the sky in summer the heat is more concentrated, making it feel warmer

3. Magnetic Earth

Compass	A magnet that points north.
North-Seeking pole	The end of a bar magnet that points north- shortened to north pole.
South-Seeking pole	The end of a bar magnet that points south- shortened to south pole.
Attract	When two magnets are pulled together. Opposite poles will attract each other.
Repel	When two magnets are pushed apart. The same poles will repel each other.
Magnetic Field	The area around a magnet where it has an effect. Can be found using iron filings or a small compass.
Magnetic Field Diagram	
Magnetic Field Strength	Strongest closest to each pole, the field gets weaker as you get further from the magnet.
Magnetic Field Direction	The direction of a magnetic field is always from the north pole towards the south pole.

4. Gravity in Space

Gravity	Force exerted by all objects with mass trying to pull other objects towards it.
Bigger Mass	The bigger the mass of an object, the stronger the force it exerts.
Weight	The force of gravity pulling on you. *Measured in Newtons (N)*
Gravitational Field	The space around the Earth where gravity attracts things.
Gravitational Field Strength (*g*)	At the surface of the Earth it is about 10 newtons per kilogram (N/kg).
Weight Formula	Weight = mass x g
Gravity and Orbits	The force of gravity keeps the Earth in its orbit of the Sun.
Satellite	Anything that orbits a planet.
Natural Satellite	Moons are examples of natural satellites.
Artificial Satellite	Can be put into orbit around Earth for photographing / transmitting TV programs etc

5. Beyond the Solar System

Constellation	Pattern of stars
Stars	Huge balls of gas that give out large amounts of energy. The Sun is a star.
Stars At Night	Appear less bright than the Sun because they are further away.
Galaxies	Large groups of stars.
Milky Way	The galaxy our Sun is in.
Universe	Made up by all of the millions of galaxies.
Light Year	Measurement of distance- the distance travelled by light in 1 year. Approximately ten million million kilometres.
Proxima Centauri	Nearest star to the Sun, about 4.22 light years away.

Lesson	Memorised?
1. Gathering the Evidence	
2. Seasons	
3. Magnetic Earth	
4. Gravity in Space	
5. Beyond the Solar System	