Year 7 Progress Booklet:

Name: _____ Class: _____

Science Teacher: _____ Pathway: _____

Progress Sheet:

In Science this year I would like to _____

_____

Assessment	Date	%	F / I / H	Meeting Pathway?
Baseline assessment				
Cells six mark question				
Organisms assessment				
Energy Marking Task				
Graph marking task				
Periodic table marking task				
Matter assessment				
Speed and graphs marking task				
Electricity marking task				
Reactions end of topic task				
Ecosystems end of topic task				

My progress in Science:

	Attitude to learning:	Progress:	How do you feel? Is there something you need to change?
Report 1			
Report 2			
Report 3			

Contents

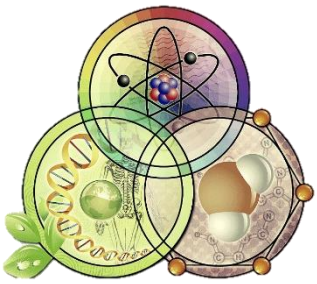
What is Science and why do we study it?

Science is the study of the natural world through observation and experiment.

In science we study a variety of different topics that relate to us and the world around this.

In science we learn knowledge and skills, we consider how we make observations, write predictions, develop inferences that we can make from our observations, how to communicate findings and improve our lives and the world around us.

Biology: the study of living organisms, their structure, adaptations and environment.



Chemistry: studies the properties of matter and how matter interacts with energy.

Physics: the study of matter and small parts that make up matter, its motion and behaviour through space and time, including energy and forces.

Where can science take us?

Whether you choose to continue to study science or use the skills it gives you, science opens a wide variety of doors, including doctor, engineer, material scientist, microbiologist, economist, meteorologist, accountant, analyst.

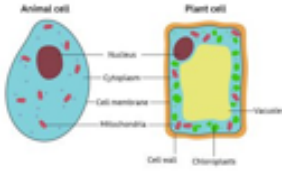






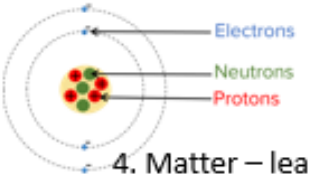
What will we learn this year?

1. Introduction to Science – what equipment do we use? What are standard units of measurement? How do we successfully draw a graph?



2. Organisms – learn about how living things are organized, including types of cells and how the skeleton works. A more detailed look at the reproductive system and healthy pregnancy.

3. Energy – what is an energy store? How does energy get transferred from one place to another?



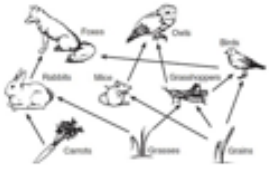
4. Matter – learn about states of matter, the periodic table and the structure of an atom. Learn how to separate different types of mixture.

How do magnets and compasses work?

5. Forces – what is a force? Learn how to calculate speed and gravity.

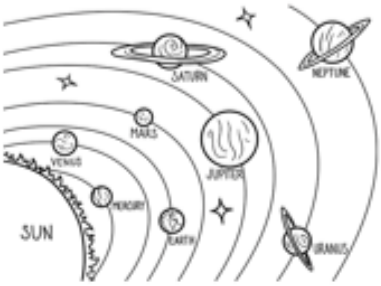
Look at speed and relative motion.

6. Energy – look at electricity – what is current? How do electromagnets work?



8. Genes and ecosystems – what is variation? How does this relate to ecosystem relationships between predators and prey?

7. Reactions – learn what acids and alkalis are and how the react together.



9. Earth Science – find out the Earth's place in the solar system and what it is made from.

Scientific Skills

Big Picture: Science involves asking questions, investigating and observing the world around us. In order for us to do this we need to think about the equipment we use and how to stay safe.

Tier 3 Vocabulary:
Equipment, safety, safety goggles, Bunsen Burner, measuring cylinder, beaker, measuring, investigation.

Circle how confident you feel at the start of the topic and the end of the topic.

Red = I know nothing **Amber = I know something** **Green = I feel confident with this**

Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Bunsen burners are used to heat substances and involve an open flame.		
Measuring cylinders are for measuring the volume of a liquid.		
Balance is for measuring the mass of a solid.		
Thermometer is for measuring temperature		
Test tubes are for small chemical reactions		
Boiling tubes are for small chemical reactions or for heating small quantities.		
Beakers and conical flasks are for larger chemical reactions.		
Funnels have filter paper in them and designed for separating mixtures.		
Scientific diagrams are simple forms of drawings that can be used in experiment plans.		
Scales are used on pieces of equipment for measuring.		
Energy = joules		
Force = newtons		
Length = meters		
Volume = cm^3		
Temperature = Degrees celcius (°C)		
Mass = kilograms		
Time = seconds		
Angle = degrees (°)		
Graph success criteria: • Drawn with a pencil and ruler • Graph should take up at least 2/3 of the graph paper. • Evenly spaced scales on axes • Labelled axes including units • Independent variable on x axis • Dependent variable on y axis • Bar chart - bars equal widths • Bar chart - spaces between bars • Line / scatter graph - small crosses to show data points. • Line / scatter graph - line of best fit • Graph title		

Organisms Target Sheet:

Big Picture: Cells are the building blocks of life on Earth, they code for who we are. How do our cells and DNA make us who we are today?

Cells:

Circle how confident you feel at the start of the topic and the end of the topic.

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Key Knowledge	Confidence before topic - RAG	Confidence after topic - RAG
Cells are microscopic and living things are made of billions of them working together.		
An organism is a living thing.		
Cell → tissue → organ → organ system → organism		
Both animal and plant cells contain: cell membrane, cytoplasm, nucleus and mitochondria.		
Only plant cells contain: cell wall, vacuole and chloroplasts.		
The nucleus contains DNA.		
The cell membrane controls what moves in and out of a cell.		
The cytoplasm is the site of chemical reactions in the cell.		
The mitochondria is the site of aerobic respiration which releases energy.		
The cell wall strengthens the cell and supports the plant.		
The vacuole contains cell sap.		
The chloroplasts absorb light and are the site of photosynthesis.		
Specialised cells have a specific role to perform. Specialised cells have special features that allow them to perform their job.		
Microscopes are used to see objects that are too small to be seen by the naked eye.		
The parts of a microscope are: eyepiece, objective lenses, stage, stage clips, arm, mirror, light source, fine focus and course focus.		
The skeleton has four main functions: To support the body To protect some of the vital organs in the body To help the body move To make blood cells.		
Joints link bones together.		
Cartilage covers the end of bones in a joint.		
Ligaments join two bones in a joint.		
Antagonistic muscles are pairs of muscles when one of those muscles relaxes, the other contracts.		
Force = moment / perpendicular distance		
Different muscles have different strengths - arm muscles are stronger than the muscles in the skin. Strength of a muscle can be measured by how much force it exerts. The strength of muscles can be measured using a newton scale.		

Reproduction:

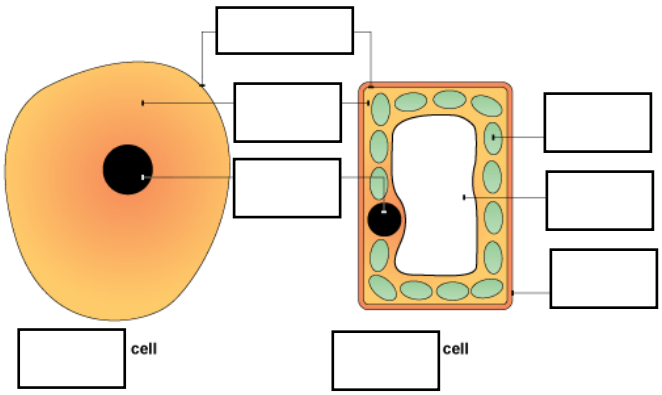
Circle how confident you feel at the start of the topic and the end of the topic.

Red = I know nothing **Amber = I know something** **Green = I feel confident with this**

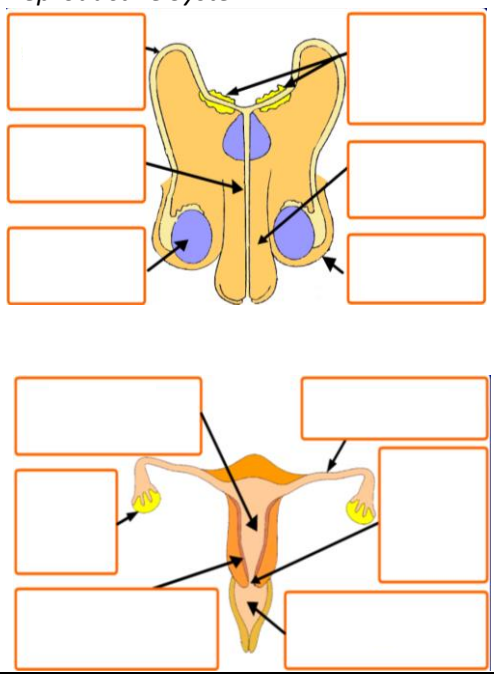
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
The parts of the male reproductive system are: glands, sperm ducts, urethra, penis and testes.		
The parts of the female reproductive system are: oviducts, ovaries, uterus, cervix and vagina.		
Puberty is the time where the reproductive system matures.		
The time between puberty and adulthood is called adolescence.		
The menstrual cycle lasts about 28 days.		
Changes in puberty happen because of the production of sex hormones.		
Fertilisation is the fusing of the nucleus of a sperm cell with the nucleus of an egg cell.		
Sexual reproduction produces offspring that are unique because they get half of their genes from each parent.		
A fertilised egg divides to form a ball of cells called an embryo.		
It takes about 40 weeks for a baby to fully develop - this is called gestation.		
The placenta is an organ responsible for providing oxygen and nutrients to the foetus and removing waste substances.		
The placenta grows into the wall of the uterus and is joined to the foetus by the umbilical cord.		
The mother's lifestyle can affect the developing foetus. The chemicals in drugs, alcohol and cigarettes can be transferred to the baby through the umbilical cord and placenta.		

Organisms Revision:

Cell Structure:



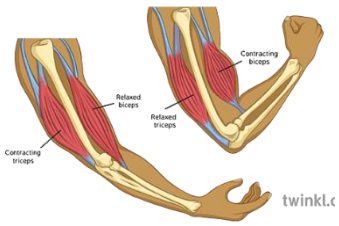
Reproductive System:



Specilaised Cells:

Reproduction:

Movement:



Pregnancy:

Energy and Magnetism Target Sheet:

Big Picture: Energy is a quantity described as being in stores that can be transferred between stores. What does the big bang have to do with energy stores and efficiency?

Circle how confident you feel at the start of the topic and the end of the topic.

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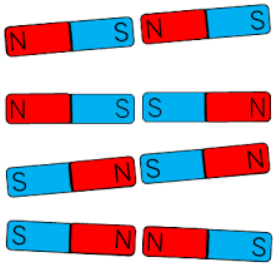
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Energy is measured in Joules (J).		
There are eight different forms of energy stores, these are: Kinetic, internal (thermal), elastic potential, gravitational potential, electrostatic, magnetic, nuclear, chemical.		
The law of the conservation of energy states that energy can't be created or destroyed only transferred from one form to another.		
The total energy of a system stays the same.		
Efficiency is how good a device is at transferring energy input into useful energy output.		
$Efficiency = \frac{useful\ energy\ output}{total\ energy\ input}\ x\ 100$		
Levers, pulleys and gears reduce the amount of force needed to do work, therefore they increase efficiency.		
A bar magnet has two poles - north and south. Like poles repel and dislike poles attract.		
A magnet makes a magnetic field around it. You cannot see this field, but its effects can be observed.		
Three types of metal are magnetic: cobalt, iron and nickel.		
The Earth behaves like a giant magnet. The Earth produces a magnetic field in which the field lines are most concentrate at the poles. Compasses rely on this magnetic field to work.		

Energy and Magnetism Revision:

Energy Stores:	*Bar Magnets:* 
Conservation of Energy:	*Magnetic Fields:*
Efficiency:	*Compasses:*

Matter Target Sheet:

Big Picture: There are 118 known elements, what happens when these elements are combined together?

Circle how confident you feel at the start of the topic and the end of the topic.

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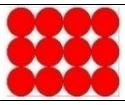
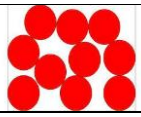
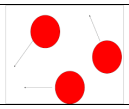
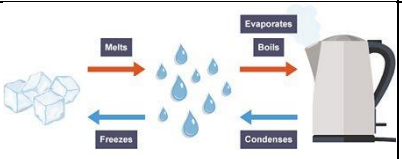
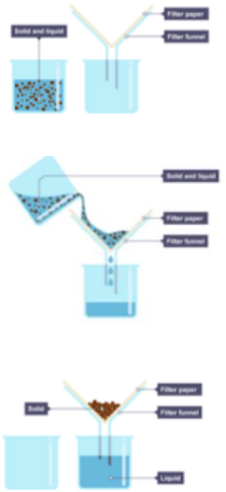
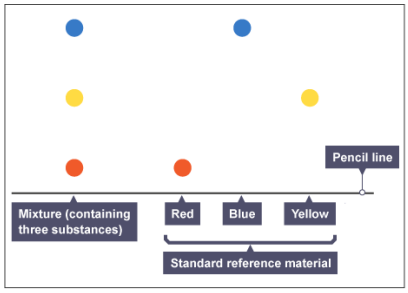
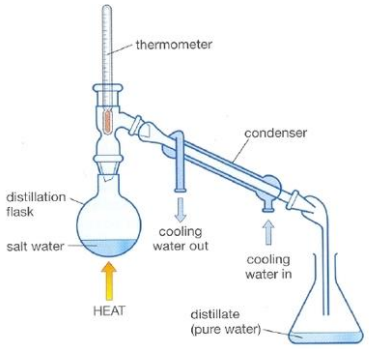
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Solids have particles that are very close together and are held in place by strong forces. Solid particles are able to vibrate but do not move. Solids can't be compressed. Solids do not flow.		
Particle model for a solid: 		
Liquid particles are close together and touching, however they are in a random arrangement. Liquid particles are able to move over each other, so liquids flow. Liquids have a fixed volume, but not a fixed shape. Liquids can't be compressed.		
Particle model for a liquid: 		
Gas particles are free to move and have no fixed arrangement. Gases are able to take the shape of their container. Gases can be compressed.		
Particle model for a gas: 		
Changes of state happen when energy is added or removed from the particles. 		
A cooling curve can be used to determine the temperatures at which changes of state occur. A cooling curve is produced by measuring the temperature of a substance as it cools and then plotting a graph of temperature against the amount of energy transferred.		
A heating curve can be produced by heating a substance at a constant rate and measuring its temperature.		
The Periodic Table is made of all of the known elements arranged in groups and periods based on their properties.		
Atoms are made of a nucleus containing protons and neutrons, and electrons that move round the outside of the nucleus in shells.		
Electrons have a negative charge.		
A compound is two or more types of atom chemically joined together.		
A mixture is two or more atoms/molecules that are not chemically joined together.		
A molecule is two or more atoms chemically joined together.		

A pure substance only contains one type of element or compound.		
Chemical formula use the symbols from the periodic table to tell you how many of what type of atom make a compound.		
The number in a chemical formula identifies the number of atoms of each type of element.		
Some elements naturally occur as diatomic molecules such as oxygen, nitrogen and chlorine.		
An element (usually metal) and another element in a compound, the second element has the ending –ide for example - NaCl sodium chlor**ide**.		
An element (usually metal) and another element + oxygen in a compound, the second element has the ending –ate for example – $NaSO_4$ sodium sulphate.		
Properties of metals include: shiny, solid at room temperature, high density, strong, malleable, good conductors of heat and electricity, sonorous.		
Properties of non-metals include: dull, solids and gases at room temperature, low density, weak, brittle, poor conductors of heat and electricity (they are insulators).		
Diffusion is the movement of particles from an area of high concentration to low concentration.		
Filtering is a separating technique used to separate a solution and an insoluble solid.		
Sieving is a separating technique that is used to separate different size solids.		
Distillation is a separating technique used to separate liquids with different melting points.		
Chromatography is a separating technique used to separate soluble inks and dyes.		

Matter Revision:

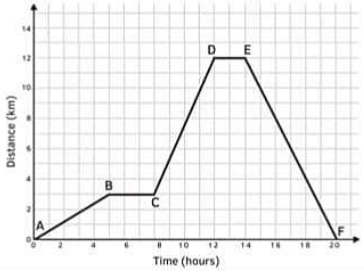
Periodic Table and Atomic Structure:	*Filtering and Crystallisation:* 
Chemical Formula and Names:	*Chromatography:* 
Elements, Compounds and Mixtures:	*Distillation:* 

Forces Target Sheet:

Big Picture: A force is a push or a pull that acts on an object due to the interaction with another object. What happens to objects when a force is applied?

Circle how confident you feel at the start of the topic and the end of the topic.

Red = I know nothing **Amber = I know something** **Green = I feel confident with this**

Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Forces are pushes or pulls that arise from the interaction between two objects.		
When a force is placed on an object it can change: speed, direction of movement or shape.		
Contact forces occur when two objects touch each other to exert a force. Examples of contact forces are friction, air resistance, normal contact force, upthrust.		
Non-contact forces occur where objects do not have to each other to exert a force. Examples of non-contact forces are gravity, magnetic, electrostatic.		
Forces are measured using a newton meter.		
The units to measure a force are Newtons (N)		
Forces act in pairs. Force arrows should be labelled with the name and size of the force.		
When two forces acting on an object are equal in size but acting in opposite directions, these forces are balanced.		
If the forces on an object are balanced the object will with stay stationary or continue moving at a constant speed in the same direction.		
When two forces acting on an object are not equal the forces are unbalanced.		
If the forces acting on an object are unbalanced the object can start moving, change speed or direction.		
Mass is the amount of matter than an object contains. It is measured in kilograms (kg) or grams (g).		
All objects with mass have a gravitational field around them. Gravitational field is the area around an object that will allow another object to feel gravitational attraction. Larger mass = larger gravitational force		
Weight is the force an object has based on its mass and the gravitational field strength. It is measured in Newtons (N)		
Weight can be calculated using the equation: weight (N) = mass (kg) x gravitational field strength (N/kg)		
Speed is a measure of how fast an object is moving and can be calculated using the equation: Speed = distance / time		
Units for speed depend on the units of the distance and time e.g. Meters per second written: ms^{-1} or m/s.		
Relative motion: When two cars are passing each other on a motor way, they look like they are moving slowly past you even though the speeds are high. This concept is relative motion.		
Distance-time graphs show the distance moved from a starting point changes over time. Time taken is plotted on the x axis. Distance travelled is plotted on the y axis.		
 The gradient of a line on a distance time graph is equal to the speed. If the line on the graph is horizontal the object is stationary. If the line on the graph is straight diagonal the object is moving at a constant speed. The steeper the line, the greater the gradient therefore the greater the speed.		

Forces Revision:

Contact and Non-Contact Forces:	*Speed*
Force Diagrams:	*Relative speed:*
Weight and gravity:	*Distance time graphs:*

Electricity and Electromagnets Target Sheet:

Big Picture: How can electricity be used in everyday life, within circuits and in magnetism?

Circle how confident you feel at the start of the topic and the end of the topic.

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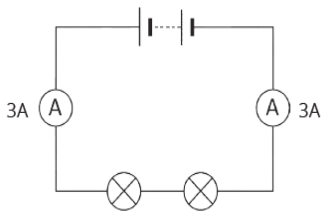
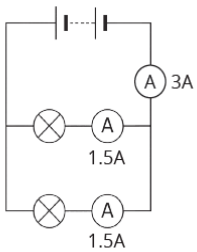
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Circuits are drawn using straight lines and right-angled corners. The components are represented by circuit symbols.		
For components in a circuit to work, the circuit needs to be complete so the current can flow.		
A series circuit is one continuous loop and increasing the number of bulbs in a series circuit will cause the light bulbs to become dimmer.		
A parallel circuit is a circuit that contains branches and increasing the number of bulbs in parallel does not affect the brightness of a bulb.		
Current is a measure of how much electric charge flows through a circuit. The more charge that flows, the bigger the current.		
Current is measured in amps (A).		
Current is measured using an ammeter connected in a circuit in series.		
An electromagnet is created when an electric current flows in a wire creating a magnetic field around the wire. A simple electromagnet has a core, coil of wire and current.		
An electromagnet can be made stronger by: Increasing the number of coils. Increasing the size of the core or changing the material. Increasing the current through the coil.		

Electricity and Electromagnets Revision:

Circuits:	*Electromagnets:*
Series and Parallel:	*Investigating Electromagnets:*
Current:   	

Reactions Target Sheet:

Big Picture: When chemicals are mixed together and make something new, a chemical reaction has happened. Where are acids and alkalis found in everyday life and why are their reactions important?

Circle how confident you feel at the start of the topic and the end of the topic.

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Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
During a chemical change a new substance it made. A change of colour, gas given off, temperature changes are all signs of a chemical reaction		
During a physical change nothing new is made, it is usually a change of state or dissolving. Physical changes are often reversible.		
Word and symbol equations show the products and reacts during a chemical change. They are written on 1 line.		
In a chemical equation: Gases = (g) Liquids = (l) Solids = (s) Aqueous = (aq)		
Acids are substances with a pH under 7. They are sour in taste and can be found in the lab and at home. Examples are sulfuric acid, nitric acid and hydrochloric acid.		
Alkalis and bases are substance with a pH over 7. They feel soapy and can be found to lab and at home. Examples are Sodium bicarbonate, Sodium hydroxide and Calcium carbonate.		
An alkali is a base that can dissolve in water. Many bases are insoluble.		
Concentration is measure of how many particles of solute are in a solution. More concentrated acids and alkalis are more corrosive. Dilute acids and alkalis are irritants.		
There are many hazard symbols such as flammable (catches fire easily), explosive, health hazard, Serious health hazard etc. These need to be considered when using different chemicals.		
An indicator is a substance that changes colour in acids and alkalis. Litmus is blue in alkalis and red/pink in acids.		
The pH scale is a measure of how strongly acidic or alkaline a substance is. Closer to pH 0 is stronger acid, closer to pH 14 is stronger alkali.		
Universal indicator changes colour for each pH level. Red (pH1) to Purple (pH 14). Neutral (pH7) is green.		
Neutralisation reactions occur when and acid and base react together in the correct amounts.		
Acid + alkali → salt + water e.g hydrochloric acid + sodium oxide → sodium chloride + water When the alkali is a carbonate, carbon dioxide is also made. e.g. hydrochloric acid + sodium carbonate → sodium chloride + water + carbon dioxide		
When making salts, they are named by using the name of the metal in the alkali and changing the name of the acid. Hydrochloric acid = chloride salts Nitric acid = nitrate salts Sulfuric acid = sulfate salts		
Neutralisation can used in everyday life. For example indigestion remedies, neutralising soil etc.		
Copper sulfate can be made by heating copper oxide and sulphuric acid.		

Reactions Revision:

Physical and Chemical Changes:	*Neutralisation Reaction:*
Acids:	*Using neutralisation:*
Alkalis and bases:	*Making Copper Sulfate:*

Ecosystems Target Sheet:

Big Picture: What happens when a species becomes extinct? Do organisms just rely on one food source. Why are organisms interdependent?

Circle how confident you feel at the start of the topic and the end of the topic.

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Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Variation can be caused by genetics, the environment or both.		
Inherited variation is caused by DNA being passed from parents to their offspring. For example: eye colour, hair colour, blood group.		
Environmental variation is caused by our environment / surroundings. For example: accent, tattoos, scars.		
Some characteristics can be caused by a combination of inheritance and environment for example height and weight.		
Continuous variations are characteristics which can be any value between the largest and the smallest such as your height.		
Discontinuous variations are characteristics which only have certain values. For example, eye colour has categories like blue, brown, green, or hazel		
Discontinuous data is plotted as a bar chart. Continuous data can be plotted as a line graph or as a histogram.		
Predator is an animal which hunts and eats other animals.		
Prey is an animal that is hunted and eaten by a predator.		
Producer is an organism which makes its own food from the sun.		
Consumer is an organism that eats other plants and / or animals.		
A primary consumer is the animal that eats the producer. Secondary consumer is the animal that eats the primary consumer. Apex/Top consumer is not eaten by anything else.		
A food chain shows how plants and animals get their energy.		
The arrows in a food chain show the movement of energy.		
A food web shows all the food chains within an ecosystem joined together.		
Herbivore is an organism which only eats plants. Omnivore is an organism which eats both plants and other animals.		
Carnivore is an organism that eats other animals.		
Predator prey cycles show the relationship between the numbers of predators and prey – when the number of predators increases, it causes the number of prey decreases, this causes the number of predators to decrease due to lack of food – this cycle continues.		
Toxic materials are poisonous, some quickly break down into harmless substances in the environment. Some toxic substances do not break down and stay in the environment.		
Persistent toxic substances accumulate in the food chain and damage the organisms in it and can't be excreted.		
Bioaccumulation is the build up of toxins in a food chain, the first organism takes in a toxin, the consumer eats multiple organisms, increasing the concentration of toxin, the next consumer eats multiple organisms, increasing the concentration of toxin.		
A quadrat is used for sampling plants in different ecosystems.		
Populations are sampled to give an estimate of the size of a population as it is more efficient than counting every member of a species.		

Genes and Ecosystems Revision:

Inherited and Environmental Variation:	*Predator Prey Relationships:*
Continuous and Discontinuous Variation:	*Bioaccumulation:*
Food Chains and Food Webs:	*Observing Ecosystems:*

Earth Science Target Sheet:

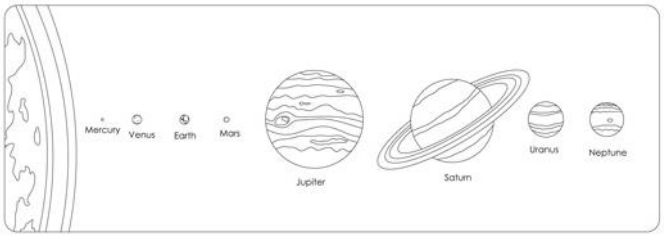
Big Picture: Humans use the Earth for survival, however, we are one tiny part of much larger systems. What is our place within the universe and what is the Earth made of?

Circle how confident you feel at the start of the topic and the end of the topic.

Red = I know nothing **Amber = I know something** **Green = I feel confident with this**

Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
The solar system contains Earth and 7 other planets. The Sun is a star at the centre. It also includes smaller objects such as asteroids. The solar system is held together by gravity.		
The order of the planets is Mercury, Venus, Earth, Mars (inner rocky planets) and Jupiter, Saturn, Uranus and Neptune (gaseous outer planets).		
The solar system is part of the Milky Way galaxy. There are billions of galaxies, each containing billions of stars.		
The path taken by one object as it moves around another object is called the orbit.		
A satellite is any orbiting object, such as the Moon is Earth's natural satellite.		
Stars emit (give out) their own light whereas planets are seen when they reflect light from the Sun.		
Universe contains all space, time and matter.		
Distances in space are vast. A light year is the distance that light travels in 1 year.		
The Earth spins on it's axis once every 24 hours – this causes day and night. The side of the Earth facing the Sun has day. The side facing away from the Sun has night.		
The Earth orbits the Sun every 365.25 days. The tilted axis causes the Earth to have seasons.		
The axis is an imaginary line passing through the centre of the Earth between the North and South poles. It is tilted at an angle of 23.4 degrees from vertical.		
The Northern hemisphere is the half of the Earth above the equator. When the Northern hemisphere tilts towards the Sun it is summer in these areas.		
The Southern hemisphere is the bottom half of the Earth below the equator. When the Southern hemisphere tilts away from the Sun it is winter in those areas.		
The Earth has four main layers: inner core, outer core, mantle and crust. The crust is the rocky outer layer of the Earth, it is about 5 - 7 km thick.		
The mantle is a layer about 300km thick made of semi-solid rock.		
The total core is about 5000km thick and made of metals.		
Rocks in the Earth's crust contain chemical compounds and elements that can be extracted and used. The composition of elements is different in different parts of the Earth.		
There are three main types of rock in the Earth's crust: igneous, sedimentary and metamorphic. Rocks are made of grains or crystals that fit together.		
Igneous rocks are formed from molten rock that has cooled and solidified. Examples of igneous rocks are basalt and granite.		
Polymers are very long chain molecules made from small repeating units called monomers.		
Composite materials are made from two or more different types of material.		
A material formed from a soft substance that is heated to make a hard material.		

Earth Science Revision:

Solar System:  	*Types of Rock:*
Day, Night and Seasons:	*Rock Cycle:*
Structure of the Earth:	*Polymers, Composites, Ceramics:*

In Science This Year:

In Science Next Year: