Year 8 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				
Reflection and Refraction marking task				
Waves assessment				
Matter Marking Task				
Respiration six mark question				
Organisms assessment				
Hooke's Law marking task				
Combustion six mark question				
Forces and reactions assessment				
Plants marking 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			

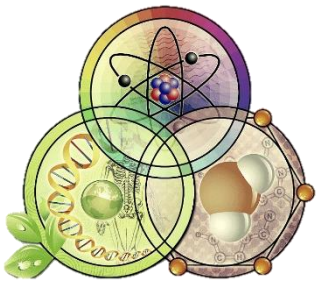
Contents

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 – how do we set up equipment? What standard units do we use and how do we draw successful graphs?

2. Waves – learn about different types of wave, using this information to explore sound and light waves.

3. Matter – learn about the elements in different groups of the periodic table.

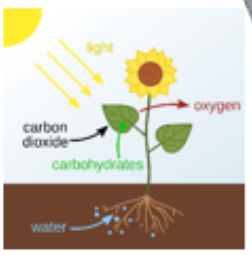
4. Organisms – explore in more detail the respiratory and digestive systems, including how to live a healthy lifestyle.

5. Forces – expand on knowledge of forces to look in more detail at Newton's first law of motion, terminal velocity and Hooke's law.

Explain and calculate pressure.

6. Reactions – using knowledge of chemical elements, learn more about a range of different chemical reactions, including combustion and displacement.

7. Ecosystems – exploring the wonderful world of plants including how they reproduce and photosynthesis.



8. Earth Science – what is the Earth's atmosphere made from? Learn about humans global impact and what we can do to make a positive difference.

Scientific Skills

Big Picture: Science involves asking questions, investigating and observing the world around us. How do scientists carry out investigations and come to conclusions?

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
Risk assessments are written to identify risks with an activity and what procedures are needed to reduce the risk.		
Glassware - could break and cause cuts / bleeding. Put in the middle of the table, test / boiling tubes in a rack.		
Bunsen burner - open flame and hot equipment could cause burns - do not put hand in the flame, move when cooled, put on safety flame when not in use.		
Chemicals - could cause irritation / corrosion depending on chemical. Wear safety goggles, replace stoppers on bottles, pour carefully.		
Heavy equipment such as masses / clamp stands - falling off the desk and hurting feet / legs. Place in the middle of the table, move back from where being used.		
kilo = x 1000		
centi = / 100		
milli = / 1000		
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		
A conclusion summarises how your results support or contradict your original hypothesis.		
Conclusion: as (independent variable) increases / decreases, the (dependent variable) increase / decreases. This happens because…		

Waves Target Sheet:

Big Picture: Waves can transfer information in many different ways, how do different types of wave transfer information?

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

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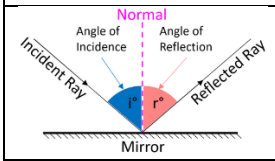
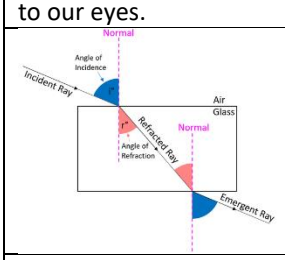
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Waves transfer energy and information from location to another without the transfer of matter.		
Light is an example of a transverse wave.		
Sound is an example of a longitudinal wave.		
Sound waves are caused by vibrations and need particles to travel.		
Sound can be reflected (echoes) or absorbed.		
Frequency is the number of waves each second and is measured in hertz.		
Wavelength is the distance between the crests of two waves next to each other, measured in meters (m).		
The higher the frequency, the higher the pitch of the sound.		
Amplitude is half the total height of the wave, the bigger the amplitude, the louder the sound.		
The sense organ that detects sound is the ear.		
The law of reflection states that the angle of incidence is equal to the angle of reflection.		
		
Light travels in a straight line from a source to an object, it is then reflected back to our eyes.		
		
The sense organ that detects light are the eyes.		
Refraction happens when light changes speed causing it to change direction.		
White light can be split into a spectrum of seven colours using a prism. This spectrum is: red, orange, yellow, green, blue, indigo, violet.		
When white light hits a coloured object, all colours are absorbed except the colour of the object which is reflected.		

Waves Revision:

Types of wave:	*Reflection:*
Sound:	*Refraction:*
Hearing:	*Colour:*

Matter Target Sheet:

Big Picture: Waves can transfer information in many different ways, how do different types of wave transfer information?

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

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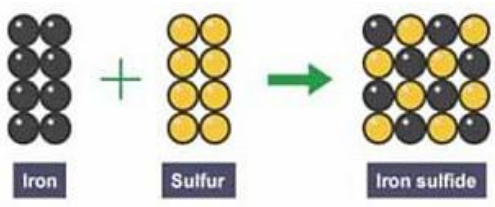
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
The Periodic Table is made of all of the known elements arranged in groups and periods based on their properties.		
Conservation of mass states that matter is not created or destroyed, therefore the mass of the reactants is equal to the mass of the products.		
Balancing equations makes sure the same number of atoms are present in the reactants and the products.		
The subscript numbers in a chemical formula show the number of each type of atom are in a molecule.		
The large number in front of an atom or molecule in a balanced equation shows the number of that type atom / element.		
When balancing equations only the large number at the front of an atom or molecule can be changed, the subscript numbers can't be changed.		
Iron sulfide is a compound, iron is a metallic element, sulfur is a non-metallic element.		
During the reaction of iron and sulfur, the reaction glows bright red, showing a chemical reaction is taking place.		
Group 1 elements are called the alkali metals.		
When a group 1 element reacts with water it makes a metal hydroxide + hydrogen.		
Reactivity increases as you go down group 1.		
Group 7 elements are called the halogens.		
Reactivity decreases as you go down group 7.		
A displacement reaction is when a more reactive element takes the place of an element in a less reactive element in a compound.		
Group 0 elements are called the noble gases.		
Group 0 elements are inert (unreactive).		

Matter Revision:

Periodic Table:	*Group 1:*
Balancing Equations:	*Group 7:*
Iron sulfide:  	*Group 0:*

Organisms Target Sheet:

Big Picture: The human body is made up of organ systems, these systems allow us to carry out every day tasks and they are adapted to allow our body to work efficiently and effectively. How are the respiratory and digestive systems adapted for 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
Breathing is the mechanical process of the lungs inflating and deflating to allow oxygen in and carbon dioxide out.		
The respiratory system has: two lungs, trachea, alveoli, bronchiole, bronchus, rubs, intercostal muscles and diaphragm.		
When we inhale: • Diaphragm contract and moves downwards • Intercostal muscles: contact, moving the ribs up and out • Volume of the ribcage: increases • Pressure in the chest decreases • Air moves into the lungs.		
When we exhale: • Diaphragm relaxes and moves upwards • Intercostal muscles: relax and the rubs move down and out. • Volume of the ribcage decreases • Pressure in the chest increases • Air moves out of the lungs.		
Gas exchange is the movement of oxygen from the lungs to the blood stream and carbon dioxide from the blood stream to the lungs.		
Alveoli are adapted to make gas exchange in lungs happen easily and efficiently. They have a large surface area, moist, thin walls and are surrounded by a large network of capillaries.		
The maximum amount of air you can breathe in and out is your vital lung capacity. Everybody's vital lung capacity is different depending on factors such as their age and fitness levels.		
Peak flow is a measure of how fast you breathe out.		
Blood oxygen is a measure of the amount of oxygen in the blood.		
Energy is needed for: growth and repair, movement, control of body temperature.		
Respiration is a chemical reaction that happens in all living cells that releases energy from glucose.		
Aerobic Respiration: glucose + oxygen --> carbon dioxide + water		
Anaerobic respiration: Glucose --> lactic acid. Respiration that happens without oxygen.		
Fermentation happens in microorganisms such as yeast, used for production of bread and alcohol: Glucose --> ethanol + carbon dioxide		
Asthma is the narrowing of airways and is treated by using an inhaler.		
Smoking can cause damage to the lungs as cigarettes release tar, carbon monoxide and nicotine.		
Good health involves getting enough of the seven food groups: carbohydrate, protein, lipid, vitamins, minerals, water and fibre.		
Too little food can cause starvation. Too much food may cause obesity and coronary heart disease.		
The amount of energy in food can be read from the food label and is measured in calories.		
Digestion is the breaking down of large insoluble molecules into smaller soluble molecules.		
Organs in the digestive system: mouth, oesophagus, liver, stomach, gall bladder, pancreas, small intestine, large intestine, rectum, anus.		
Enzymes are biological molecules that speed up chemical reactions.		
Peristalsis is the contraction and relaxation of muscle to move food along.		
The small intestine has many tiny villi that increase the surface area. Villi have thin walls to allow for molecules to diffuse quickly.		

Organisms Revision:

Digestive system:	*Respiratory system:*
Adaptations of the digestive system:	*Adaptations of the respiratory system:*
Balanced diet:	*Smoking vs asthma:*

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. How can the size of force affect an object or it's characteristics?

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Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Forces are pushes or pulls that arise from the interaction between two objects.		
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.		
If the forces acting on an object are unbalanced the object can start moving, change speed or direction.		
Newton's First Law of Motion states that objects with balanced forces acting on them will stay at rest or stay in constant motion.		
The overall force acting on an object is the resultant force.		
To calculate resultant forces: Bigger force - smaller force = resultant force		
Drag is a force that acts on object causing it to slow down as it moves through a liquid or gas.		
Streamlined shapes are pointed and allow the fluid to pass around a moving object.		
Air resistance is caused by air particles hitting a falling object, causing it to slow down.		
An object with a larger surface area will experience more air resistance than an object with a smaller surface area, because more air particles come in contact with the surface.		
Terminal velocity is the maximum speed a falling object can reach.		
Elastic materials and objects such as springs, change shape when a force is exerted on them.		
Hooke's law describes that the extension of an object or material is directly proportional to the force applied.		
Directly proportional means as one variable increases, the other variable increases at the same rate. For example, if you double variable one, variable two will double.		
Pressure is the force exerted over an area.		
Pressure = force / area		
Atmospheric pressure changes with altitude. The higher you go: The lower the weight of the air above you The lower the atmospheric pressure		
The pressure in liquids changes on the depth. The deeper you go: The greater the weight of the liquid above The greater the liquid pressure.		

Forces Revision:

Resultant Forces:	*Hooke's Law:*
Drag:	*Pressure:*
Terminal Velocity:	*Pressure in fluids:*

Reactions Target Sheet:

Big Picture: A chemical reaction can be observed in many ways and the reactivity of the reactants will impact on the speed the reaction takes place and the products of the reaction. What different types of chemical reaction occur in everyday activities?

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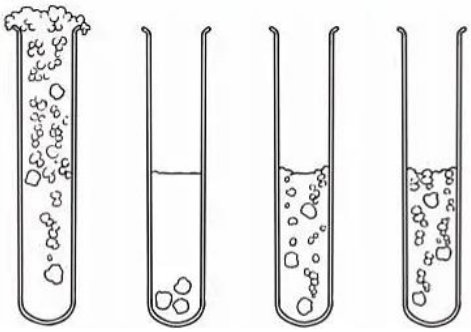
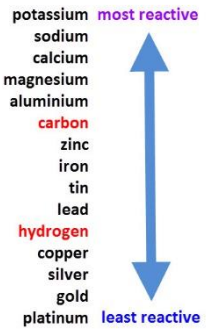
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
An exothermic reaction is one in which energy is released to the surroundings. The temperature will increase.		
Examples of exothermic reactions include combustion and neutralisation.		
An endothermic reaction takes in energy from the surroundings. The temperature will decrease.		
Examples of endothermic reactions include thermal decomposition.		
Metal + acid → salt + hydrogen		
The test for hydrogen is the squeaky pop test.		
The reactivity series is a list of metals from the most reactive to least reactive.		
Displacement reactions happen when a more reactive element takes the place of a less reactive element in a compound.		
Combustion is another name for burning.		
Combustion needs a fuel (a chemical store that releases energy when burnt), oxygen and heat.		
When a hydrocarbon fuel is burnt it releases carbon dioxide and water.		
Complete combustion is the burning of a fuel in a plentiful supply of oxygen.		
Hydrocarbon + oxygen → carbon dioxide + water		
Incomplete combustion happens when there is not a plentiful supply of oxygen – it produces carbon monoxide and carbon particulates (carbon particulates).		
Hydrocarbon + limited oxygen → water + carbon monoxide + carbon particulates		
Thermal decomposition is the break down of a compound using heat.		
Metal carbonate → metal oxide + carbon dioxide		
The test for carbon dioxide gas is to bubble the gas through limewater. If the limewater turns cloudy, carbon dioxide is present.		
A catalyst speeds up a reaction without being used up in the reaction itself.		
Catalytic converters are used in the exhaust systems of cars to reduce the toxic gases that are released from combustion engines.		

Reactions Revision:

Exothermic and Endothermic Reactions:	*Combustion:*
Metal + acid: 	*Thermal Decomposition:*
Reactivity Series and Displacement: 	*Catalysts:*

Organisms – Plants Target Sheet:

Big Picture: Plants are living things that reproduce and make their own food. How does this happen and what is photosynthesis?

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Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
Organisation - cell--> tissue --> organ --> organ system --> organism		
Organs in a plant are the flower, roots and stem.		
Parts of a plant include: petal, anther, stamen, filament, stigma, ovary, ovule, nectary and sepal.		
Pollination involves the movement of of pollen grains from the anther of one flower to the stigma of another flower.		
Pollination can happen via insects or wind.		
The sex cells in the flower are: ovule (female) and pollen grain (male).		
Fertilisation occurs in a plant when the nucleus of the pollen grain joins with the nucleus of the ovule.		
A seed has three main parts: Embryo, food store and seed coat.		
Many crops depend on pollination by insects to survive.		
Without pollinators food security would be threatened and there would be a worldwide shortage of fruit.		
Plants compete with each other for light, water, space and minerals.		
Four methods of seed dispersal: wind, animal (inside), animal (outside) and self-propelled.		
Seed banks store seeds for plants to ensure they can be grown – maintaining biodiversity.		
Plants contain palisade cells in the leaves to absorb light for photosynthesis.		
Plants have root hair cells that absorb water and nutrients.		
Water moves into plants via diffusion through the root hair cells.		
Root hair cells have a large surface area for the absorption of water.		
Xylem tubes transport water through the leaf and plant.		
Phloem tubes carry food through the leaf and plant.		
Plant cells contain cell membrane, cytoplasm, nucleus, mitochondria, cell wall, vacuole and chloroplasts.		
Plants make their own food (glucose) in a process called photosynthesis.		
Photosynthesis is important for maintaining the levels of oxygen and carbon dioxide in the atmosphere.		
The word equation for photosynthesis is: carbon dioxide + water --> glucose + oxygen		
Photosynthesis happens inside chloroplasts.		
Chloroplasts contain chlorophyll which absorbs light for photosynthesis.		
Plants get carbon dioxide from the air it enters the leaf through stomata.		
Plants get water from the ground and is absorbed by the roots.		
Oxygen produced is released into the air from the leaves.		
Glucose can be turned into other substances such as starch or used in respiration.		
To test if a plant has been photosynthesising you can test the leaf with iodine to see if starch is present.		
If starch is present, iodine will turn black.		
Plants and trees remove carbon dioxide from the atmosphere.		
Plants are a source of food for many species on Earth.		
Plants can be used to make drugs including: aspirin comes from willow trees, caffeine comes from coffee beans, tea leaves and cacao pods, nicotine comes from tobacco plants		

Organisms - Plants Revision:

Structure of Plants:	*Photosynthesis:*
Plant Reproduction:	*Investigating Starch:*
Seed Dispersal Investigation:	*Importance of Plants and Insects:*

Earth Science Target Sheet:

Big Picture: Humans are having a large and possibly catastrophic impact on Earth, how do we live sustainably and put actions into place to allow future generations and the Earth to flourish?

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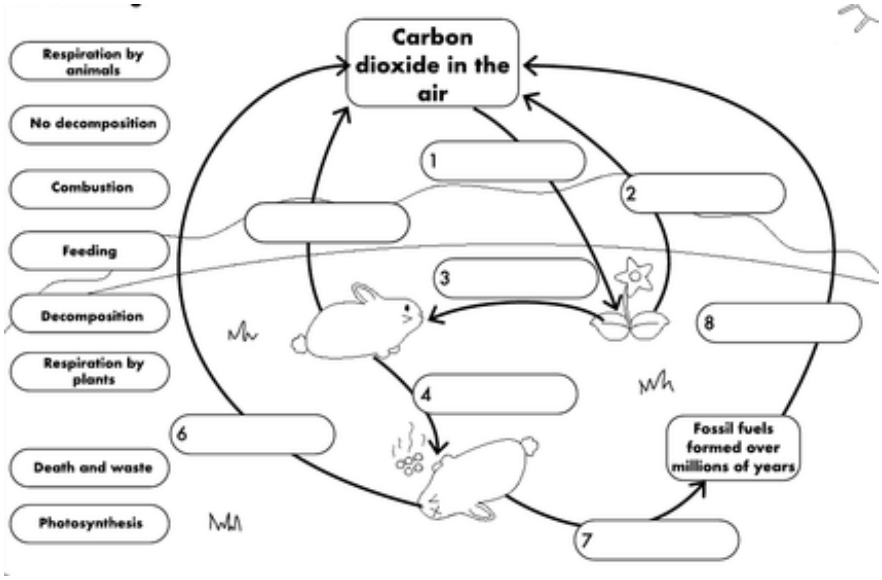
Key Knowledge	Confidence before topic RAG	Confidence after topic RAG
The atmosphere is made of: nitrogen (78%), oxygen (21%), argon (0.9%) and traces of other gases.		
Carbon is an essential element for every living organism. It is constantly being recycled, this is shown in the Carbon cycle.		
Carbon is removed from the atmosphere by plants during photosynthesis.		
Carbon is added to the atmosphere by respiration, combustion and decomposing.		
Deforestation happens when humans cut down trees for fuels or farming, building.		
Deforestation leads to less carbon dioxide being removed from the atmosphere.		
Human activities produce waste through rubbish, chemical pollutants from industry and by burning fuels.		
Greenhouse gases include: carbon dioxide, methane, CFCs and water vapour.		
The build up of greenhouse gases can trap more radiation in the atmosphere, this can lead to global warming.		
Climate describes weather patterns which happen over a period of time.		
Global warming is the rise in the average temperature of the Earth's surface and can lead to climate change.		
Effects of global warming: ice melting faster than it can be replaced in the Arctic and Antarctic, oceans are warming up, sea levels are rising, changes in plant and animal habitats. Deserts getting larger. More extreme weather events e.g. storms.		
Sustainable development means that that future generations will have the resources available to survive.		
Many groups of people that play an important role in the development of a sustainable future, they include: activists, UK Government, energy companies, transport companies and agriculture.		

Earth Science Revision:

Earth's Atmosphere:

Humans on Earth:

Carbon Cycle:



Global warming and climate change:

In Science This Year:

In Science Next Year: