Science Curriculum Map

The knowledge and skills described in the National Curriculum have been mapped out across year groups and then divided into the academic year.

A pupil working through the plan below from Autumn 1 in year 1 to Summer 2 in year 9 would have covered all aspects of the National Curriculum in a sequential, logical way.

Some of the individual objectives are started in one half term but then are ongoing through all of the rest of the year.

They are revisited through the various topics / concepts being taught

Teachers take this map and then use it to devise a sequence of learning activities over the half term.

Teachers start by considering the starting points of each of the pupils in their class group.

Given that we are teaching pupils with SEND or with an often challenging educational history there will be pupils who are chronologically older but are still working at the level of a much younger pupil.

Our teachers ensure that they plan lessons which will build on strong foundations then move forward through the map ensuring the learning is embedded in the memory of the individual pupils

For example, some of our pupils may be chronologically year 7 but are working through the map at year 3.

They may also be working at year 3 in Light and sound but at year 5 in plants and biology

This map helps a teacher to plan lessons which meet the exact need of the individual pupils while teaching a similar topic to a whole class.

	KPI's
	Ongoing focus on working scientifically throughout all topics

Year Group	Autumn 1 Physics (Seasons)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans)	Spring 2 Physics (Forces and magnets.)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Plants)
1	I can observe and comment on changes in the seasons.	I can distinguish between an object and the material it is made from.	I can name a variety of animals including fish, amphibians, reptiles, birds and mammals.	I can recognise the difference between push and pull.	I can identify things that are living, dead and never lived. (year 2 KPI.)	I can name a variety of common wild and garden plants.
		I can explain the materials that an object is made from.	I can classify and name animals by what they eat			I can name the petals, stem, leaf and root of a plant.

			(carnivore, herbivore and omnivore.)			
		I can name wood, plastic, glass, metal, water and rock.	I can sort animals into categories (including fish, amphibians, reptiles, birds and mammals.)			I can name the roots, trunk, branches and leaves of a tree.
	I can name the seasons and suggest the type of weather in each season.	I can describe the properties of everyday materials.	I can sort living and non-living things.	I can describe different types of movement.	I can describe how a specific habitat provides for the basic needs of living things here. (plants and animals.) Year 2 KPI.	
		I can group objects based on the materials they are made from.	I can name the parts of the human body that I can see.			
			I can link the correct part of the human body to each sense.			

	I can use simple equipment to make observations.
	I can ask simple scientific questions.
	I can carry out simple tests.

Year Group	Autumn 1 Physics (Seasons)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans)	Spring 2 Physics (Forces and magnets.)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Plants.)
2	I can observe and comment on changes in the seasons.	I can identify and name a range of materials including, wood, metal, plastic, glass, brick, rock, paper and cardboard.	I can explain the basic stages in a life cycle for animals, including humans.	I can recognise the difference between push and pull.	I can identify and name plants and animals in a range of habitats.	I can describe how seeds and bulbs turn into plants.
	I can name the seasons and suggest the type of weather in each season.	I can suggest why a material might or might not be used for a specific job.	I can describe what animals and humans need to survive.	I can describe different types of movement.	I can match living things to their habitat.	I can describe what plants need in order to grow and stay healthy. (Water,

		I can explore how shapes can be changed, by bending, twisting and stretching.	I can describe why exercise, balanced diet and good hygiene are important for humans.		I can describe how animals find their food. I can name some different sources of food for animals I can explain a simple food chain.	light and suitable temperature.)
	I can identify and classify things.					
	I can suggest what I have found out.					
	I can use simple data to ask questions.					

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans) Physics (Sound)	Spring 2 Physics (Forces and magnets.)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Plants.)

3	I can describe what dark is (the absence of light.)	Rocks - I can compare and group rocks based on their appearance and physical properties (reason).	I can explain the importance of a nutritious balanced diet. (Biology)	I can explore and describe how magnets move on different surfaces.	I can group living things in different ways. (year 4 KPI.)	I can describe the function of different parts of flowering plants and trees.
	I can explain that light is needed in order to see.	I can describe how fossils are formed.	I can explain how nutrients, water and oxygen are transported within animals and humans. (Biology)	I can explain how some forces require contact and some do not. (Giving examples.)		
	I can explain that light is reflected from a surface.	I can describe how soil is made.	I can describe and explain the skeletal system of a human. (Biology)	I can explain how objects attract and repel in relation to objects and magnets.		
		I can describe the difference between igneous and sedimentary rock.	I can describe and explain the muscular system of a human. (Biology)	I can predict whether objects will be magnetic and carry out an enquiry to test this.		I can explore and describe the needs of different plants for survival.

			I can describe the purpose of the skeleton in humans and animals. (Biology)	I can describe how magnets work.		
			I can describe how sound is made. (Physics.)	I can predict whether magnets will attract or repel and give a reason for this.		
			I can describe how sound travels from a source to our ear. (Physics.)			
			I can explain the place of vibration in hearing. (Physics.)			
	I can ask relevant scientific questions.					
	I can use observations and knowledge to answer scientific questions.					
	I can set up a simple enquiry to explore a scientific question.					

	I can set up a test to compare two things.
	I can set up a fair test and explain why it is fair.
	I can make careful and accurate observations including the use of standard units.
	I can use equipment, including thermometers and dataloggers to make measurements.
	I can gather, record, classify and present data in different ways to answer scientific questions.

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans) Physics (Sound)	Spring 2 Physics (Electricity.)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Plants)

4	I can explain and demonstrate how a shadow is formed.	States of matter I can group materials based on their state of matter (solid, liquid, gas).	I can identify and name the parts of the human digestive system. (Biology)	I can identify and name appliances that need electricity to function.	I can use classification keys to group, identify and name living things.	I can explore and describe how water is transported within plants.
	I can explore shadow size and explain.	I can describe how some materials can change state.	I can describe the functions of the organs in human digestive systems. (Biology)	I can construct a series circuit.		I can describe the plant life cycle, especially the importance of the flower.
	I can explain the danger of direct sunlight ad describe how to keep protected.	I can explore how materials change state.	I can identify and describe the different types of teeth in humans. (Biology)	I can identify and name the components in a series circuit. (cells, wires, bulbs, switches and buzzers.)	I can create classification keys to group, identify and name living things (others to use.)	
		I can measure the temperature at	I can describe the functions of	I can draw a circuit diagram.		

		which materials change state.	different humans teeth. (Biology)			
		I can describe the water cycle.	I can construct food chains to identify producers, predators and prey. (Biology)	I can predict and test whether a lamp will light within a circuit.	I can describe how changes to an environment could endanger living things.	
		I can explain the part played by evaporation and condensation in the water cycle.	I can use food chain to identify producers, predators and prey. (Biology)	I can describe the function of a switch within a circuit.		
			I can explore the correlation between pitch and the object producing a sound. (Physics.)	I can describe the difference between conductors and insulators, giving examples of each.		
			I can explore the correlation between the volume of a sound and the strength of the			

			vibrations produced by it. (Physics.) I can describe what happens to a sound as it travels away from its source. (Physics.)			
	I can draw conclusions and suggest improvements.					
	I can use findings to report in different ways including oral and written explanations and presentation.					
	I can make a prediction with a reason.					
	I can identify differences similarities and changes related to an enquiry.					
	I can use diagrams, keys, bar charts and tables; using scientific language.					

Year Group	Autumn 1 Physics (Earth and Space.)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans)	Spring 2 Physics (Forces)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Evolution and inheritance.)
5	I can describe and explain the movement of the Earth and other planets relative to the sun.	I can compare and group materials based on their properties (e.g. Hardness, solubility, transparency) I can describe how a material dissolves to form a solution explaining the process of dissolving.	I can create a timeline to indicate stages of growth in humans.	I can explain what gravity is and its impact on our lives.	I can describe the life cycle of different living things e.g. mammal, amphibian, insect and bird.	I can describe how the Earth and living things have changed over time.

	I can describe and explain the movement of the moon relative to the Earth.	I can describe how some materials can be separated.		I can identify and explain the effect of air resistance.	I can describe the differences between different life cycles.	
		I can demonstrate how materials can be separated (through sieving, filtering and evaporating.				
	I can explain and demonstrate how night and day are created.	I know and can demonstrate that some changes are reversible and some are not.		I can identify and explain the effect of water resistance.	I can describe the process of reproduction in plants.	
		I can discuss reversible and irreversible changes.				

	I can describe the Sun, Earth and Moon (using the term spherical.)	I know mixing and dissolving are reversible changes.		I identify and explain the effect of friction.	I can describe the process of reproduction in animals.	
		I know that burning, and frying an egg are chemical changes -IRR		I can explain how levers, gears and pulleys allow a smaller force to have a greater effect.		
	I can control variables in an enquiry.					
	I can plan different types of scientific enquiry.					
	I can measure accurately and precisely using a range of equipment.					
	I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.					
	I can use the outcome of test results to make predictions and set up a further comparative fair test.					
	I can plan different types of scientific enquiry.					

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (Animals including Humans)	Spring 2 Physics (Electricity.)	Summer 1 Biology (Living things and their habitats)	Summer 2 Biology (Evolution and inheritance.)
6	I can explain how light travels.	I can compare and group materials based on their properties (e.g. Hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.	I can identify and name the main parts of the human circulatory system.	I can explain how the number and voltage of cells in a circuit links to the brightness of a lamp or to the volume of a buzzer.	I can classify living things into broad groups according to observable characteristics and based on similarities and differences.	I can describe how the Earth and living things have changed over time.

		I can describe and show to recover a substance from a solution.				I can explain how fossils can be used to explain about the past.
	I can explain and demonstrate how we can see objects.	I can explain how some changes result in the formation of new material and that this is usually irreversible.	I can describe the function of the heart, blood vessels and blood.	I can compare and give reasons for why components work and do not work in a circuit.	I can describe how living things have been classified.	I can explain about reproduction and offspring (recognising that offspring normally vary and are not identified to their parents.)
		I can give evidenced reasons why materials should be used for specific purposes.				I can explain how animals and plants are adapted to suit their environment.
	I can explain why shadows have the same shape as the object that casts them.	I can say a CR has occurred from a change in colour/heat/gas.	I can discuss the impact of diet, exercise, drugs and lifestyle on health.	I can draw circuit diagrams using correct symbols.	I can give reasons for classifying animals in a specific way.	I can link adaptation over time to evolution.

		I can give an example of a physical and chemical change.				I can explain evolution.
	I can explain how simple optical instruments work e.g. Periscope, telescope, binoculars, mirror, magnifying glass etc.	I know that a chemical reaction makes a new substance. I know burning & rusting are chemical reactions.	I can describe the ways in which nutrients and water are transported in animals, including humans.			
	I can report findings from enquiries in a range of ways.					
	I can explain a conclusion from an enquiry.					
	I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.					
	I can explain causal relationships in an enquiry.					

	Read, spell and pronounce vocabulary accurately.

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (The Skeletal and Muscular system, Gas exchange- animals and plants and Digestion, Nutrition. Nutrition will be taught in PSHE lessons.)	Spring 2 Physics (Sound and observed waves.)	Summer 1 Biology (Relationships in Ecosystem)	Summer 2 Chemistry (Materials)

7	I know that light is transverse wave.	I can identify an acid/alkaline/neutral with UI	I know the skeleton supports, protects, makes blood cells and create movement. (Skeletal and muscular.)	I know that when 2 troughs come together they add to make a larger trough.	I know that toxins are passed on up the f.c.	I can name a reactive material.
	I know that light waves travel very fast and that they are faster than sound waves.	I can use the pH scale	I can name the skull, ribs, jaw, spine and femur. (Skeletal and muscular.)	I can explain how sound travels.	I know that plants make their own food using photosynthesis.	I can name an unreactive material.
	I can explain the terms- Opaque, transparent and translucent in terms of light transmission.	I know that atoms are rearranged in a chemical reaction.	I know bones are rigid and that this means they cannot bend. (Skeletal and muscular.)	I can explain simply how the ear works.	I know that animals need oxygen for respiration.	I can name a metal at the top and bottom (r.s) and that carbon is between these metals.
	I can use a datalogger to measure light (in-lux) to test light transmission levels.	I can describe what is needed for combustion.	I know the skeleton is made of 206 bones. (Skeletal and muscular.)	I can draw- loud, quiet low and high frequency sounds.	I know that plants produce 02 during photosynthesis which animals then breathe.	I can explain what an ore is and understand that there are different ways of extracting materials.

	I know that in mirror image the image is reversed and the same size/ distance/ way up.	I know that rusting is a form of oxidation a reaction of iron with oxygen in the air.	I can name and locate the biceps and triceps. (Skeletal and muscular.)	I know that a human's hearing range is: 20 Hz- 20, 000 Hz.	I know the direction energy is transferred along a food chain.	I know that a more reactive metal will displace a less reactive metal.
	I can explain refraction as the change in the speed of light with different media.	I know that compounds can be broken down by heating.	I know that muscles work in pairs. (Skeletal and muscular.)	I know that loudness is measured in decibels and can use a datalogger to measure it.	I know that a producer is at the start of a food chain and that it makes its own food.	I know that carbon is used to extract iron in a blast furnace.
	I can describe how pinhole camera works in simple terms.	I know that more reactive metals can displace a less reactive metal from its compound.	I know when one muscle contracts the other relaxes. (Skeletal and muscular.)	I can explain echolocation.	I know that the ultimate predator is at the top of the chain and isn't eaten.	I know ceramics are made of baked clay.
	I can explain simply how the eye works.	I can identify a wide range of acids/alkaline/neutral substances giving their pH.	I know a joint is where 2 bones meet. (Skeletal and muscular.)	I can explain some of the uses of ultrasound.	I can describe the terms- carnivore, herbivore and omnivore.	I know that polymers can be plastic made of crude oil.

	I know a convex lens focusses light.	I know an acid + alkali produces a salt & water.	I can label a diagram to show the wind-pipe, lungs and alveoli. (Gas exchange- animal and plants.)	I know sound frequency is measured in hertz-HZ.	I can describe how pollination occurs and why this is needed.	I know a composite is more than one substance.
	I know a prism is used to split light.	I know metals react with acid to produce salt + hydrogen.	I know that gas exchange happens in the lungs in the alveoli. (Gas exchange- animal and plants.)			I can give one useful property of each material.
		I know catalysts speed up reactions.	I know that muscles control breathing. I can name the diaphragm. (Gas exchange- animal and plants.)			
			I can measure lung vol. and know what this measures. (Gas exchange- animal and plants.)			

			I know breathing exercise is deeper and faster as more 02 is needed. (Gas exchange- animal and plants.)			
			I know smoking produces tar which damages cilia making you cough more. (Gas exchange- animal and plants.)			
			I can describe two asthma symptoms. (Gas exchange- animal and plants.)			
			I can name the mouth, gullet, stomach, small and large intestine as part of the d.s. (Digestion.)			
			I know digestion breaks down food so			

			we can use the nutrients it contains. (Digestion.)			
			I can explain the difference between mechanical and chemical digestion. (Digestion.)			
			I can describe in simple terms the functions of the large and small intestine, the pancreas and the liver. (Digestion.)			
			I know that it is important to have bacteria in your d.s. (Digestion.)			
			I know that photosynthesis is the term used to describe			

			plants making their own food from light. (Digestion.)			
			I know plants take in water and C02 and energy from the sun to make sugars. (Digestion.)			
			I know plant roots absorb water and minerals. (Digestion.)			
			I can name at least one type of food that contains carbs, proteins and fats. (Nutrition.)			
			I know we need calcium to keep our bones strong. (Nutrition.)			
			I know a balanced diet includes the right			

			amount of nutrients, fibre and water. (Nutrition.)			
			I can explain why we need plenty of fresh fruit and vegetables in our diet. (Nutrition.)			
			I can explain why a person can become obese and describe can associated health issues. (Nutrition.)			
			I know the different people need different amounts of energy. (Nutrition.)			
	I can ask a question to develop my scientific knowledge based on an observation of the real world.					
	I can make a prediction based on my observations of the real world					
	I can identify what is being changed in an investigation.					

	With support I can follow teacher instructions to complete laboratory and field work safely.
	I can make and record observations with support.
	I can suggest an improvement to my investigation. (measurements and observations)
	With teacher support I can use simple sampling techniques to gather data.
	I can choose appropriate SI units when taking part in measurement tasks (e.g. Cm, m, ml, l etc.)
	With support I can use simple equations to carry out calculations.
	I can collect continuous and discrete data and create appropriate graphical representations with some support.
	With support I can use mathematics to analyse my results.
	With support I can present my data in appropriate tables and graphs.
	I can identify a simple pattern from my data.
	I can explain my findings in simple terms and can say whether my prediction was correct.
	With support I can identify an anomaly/outlier in my results.

	With support I can use my results to ask a further question.
	I can suggest an improvement to my work during investigations.
	I can explain one scientific theory that was modified in the light of new evidence & ideas (e.g. Phlogiston theory).
	I can identify simple risks & sensible precautions to take to minimise those risks.

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (The Skeletal and Muscular system, Gas exchange- animals and plants and Digestion , Nutrition. Nutrition will be taught in PSHE lessons.))	Spring 2 Physics (Sound and observed waves.)	Summer 1 Biology (Relationships in the Ecosystem.)	Summer 2 Chemistry (Materials.)
8	I know that light is a transverse wave and can describe its movement.	I can give a word equation for a chemical reaction.	I can give examples of how the skeleton supports, protects, makes cells and	I can define constructive and destructive waves that peak and	I know the simple equation for photosynthesis.	I can relate reactivity to how a metal will be found in the Earth's crust.

			moves. (The skeletal and muscular system.)	trough of the same size cancels out.		
	I know that light travels at 300, 000, 000 m\s and does not need particles to move through.	I know that atoms are not made or destroyed in a CR and that the mass stays the same.	I know bones contain marrow and that white and red blood cells are made here. (The skeletal and muscular system.)	I can explain the differences between sound travel in solids, liquids and gases.	I can explain animal respiration in simple terms and relate to the ecosystem.	I can name (in the correct) order six metals in the reactivity series, including placing carbon.
	I can describe and explain the terms transmission, absorption, specular reflection and d.scattering.	I can describe complete and incomplete combustion.	I can name the bones of the arm and the lower leg. (The skeletal and muscular system.)	I can explain in detail how the ear works including energy transfers.	I can name all parts of the food chain.	I can say which metals need to be reduced by carbon and which removed by electrolysis and why.
	I know that the angle of incidence = the angle of reflection in specular reflection.	I can describe the term Thermal decomposition and give an example.	I know we are born with 230 bones and some of these fuse as we grow. (The skeletal and muscular system.)	I can define the terms amplitude, frequency and wavelength related to sound waves.	I can describe in detail what will happen if the f.c is disrupted.	I can give more than one useful property of each material and relate this to common use.

	I can describe the main differences in real and mirror images.	I can describe the meaning of displacement and give a word equation example.	I can name 2 sets of antagonistic muscles. (The skeletal and muscular system.)	I know that the speed of sound in air is approx. 330m/s.	I know that animals at the top of the food chain will be more I affected by toxins due to build up.	I know polymers are long chains of monomers joined together by polymerisation.
	I can explain refraction and describe how light bends towards the normal.	I can identify a/alk/ne and say whether they are weak or strong & give neutralising pH.	I know tendons connect muscles to bones. (The skeletal and muscular system.)	I can measure the speed of sound using speed= d/t	I can describe the importance of pollinators to food security and some alternatives to pollination.	I know that there are synthetic and natural polymers.
	I can describe the image produced by a pinhole camera including diagrams.	I can give word equations for neutralisation reactions identifying the correct salt produced.	When a muscle contracts it pulls the bone. (The skeletal and muscular system.)	I can explain the terms ultrasound and infrasound.		
	I can name main features of the eye.	I can say why some metals react with acids (r.s.)	I can describe muscle action in bent and straight arms. (The skeletal	I can give at least 2 uses of ultrasound.		

			and muscular system.)			
	I can name order light is split by a prism.		I can name several joints and can draw a ball and socket. (The skeletal and muscular system.)			
	I can predict and explain colour filter phenomena.		I can label a diagram to show 8 components of the respiratory system. (Gas exchange- animals and plants.)			
			I can explain the process of g.e. in simple terms. (Gas exchange- animals and plants.)			
			I can simply describe exhalation and inhalation and the muscles involved. (Gas			

			exchange- animals and plants.)			
			I know how body size affects lunch volume. (Gas exchange- animals and plants.)			
			I can describe how an asthma attack may be caused and what happens in the lungs. (Gas exchange- animals and plants.)			
			I know 4 components of cigarettes and dmg.cilia cant get rid of mucus properly. (Gas exchange- animals and plants.)			

			I can name parts of the d.s. including the pancreas and liver. (Digestion.)			
			I know digestion is facilitated by chemicals called enzymes. I can name 2 organs that make these. (Digestion.)			
			I can give examples of mechanical and chemical digestion, giving examples. (Digestion.)			
			I can describe functions of 5 parts of the d.s. in detail. (Digestion.)			
			I can give 2 reasons why it is good to			

			have bacteria in your d.s. (Digestion.)			
			I know the simple equation for photosynthesis. (Digestion.)			
			I know that chlorophyll in green leaves is used to fix sunlight as plants make glucose. (Digestion.)			
			I can name at least one mineral a plant needs. (Digestion.)			
			I can explain why leaves are flat, wide and contain chloroplasts. (Digestion.)			
			I can give a simple description of the function of each			

			food type. (Nutrition.)			
			I can define what: 'nutrition' means. (Nutrition.)			
			I can name iron as an important mineral and give one way it is used in the body. (Nutrition.)			
			I can explain why fibre is important and give examples of fibre rich foods. (Nutrition.)			
			I can describe at least 2 effects of obesity and starvation. (Nutrition.)			
			I can work out simple BER			

			calculations. (Nutrition.) I know that body mass effects energy requirements. (Nutrition.)			
	I can develop my own scientific question for investigation using ideas based on observations of the real world.					
	I can make a prediction based on real world observations and prior scientific knowledge.					
	I can identify what is being changed and what is being kept the same in investigation.					
	I can follow teacher instructions to independently complete laboratory and field work safely.					
	I can convert SI units where appropriate and can recognise an increasing number of symbols from the Periodic Table.					
	I can use a formula triangle to derive simple equations and use this to carry out calculations.					
	I can create and interpret frequency tables created from continuous and discrete data.					
	I can independently use mathematical techniques e.g., finding the mean, median, mode and range of a set of data.					

	I can present my data in tables and graphs choosing the appropriate form of graph. I can do this independently.
	I can identify patterns from data using observations and data to draw conclusions.
	I can explain my findings using scientific language and can evaluate my findings in terms of my prediction.
	I can identify anomalous results and suggest reasons why this may have occurred.
	I can analyse my results and ask further questions based on what I have found out.
	I regularly use repeated measures in my experimental design and when carrying out practical work.
	I can explain why scientists publish their results.
	I can identify the main risks during practical work and take sensible precautions to minimise those risks.

Year Group	Autumn 1 Physics (Light)	Autumn 2 Chemistry	Spring 1 Biology (The Skeletal and Muscular system, Gas exchange- animals and plants and Digestion, Nutrition. Nutrition will be taught in PSHE lessons.)	Spring 2 Physics (Sound and Observed waves.)	Summer 1 Biology (Relationships in an Ecosystem.)	Summer 2 Chemistry (Materials.)
9	I can compare light, sound and water waves. Describing movement and phenomena.	I can give a symbol equation for a CR & can check if the equation is balanced.	I can give detailed examples of 4 basic functions of the skeleton. (The skeletal and muscular systems.)	I can explain why sound cannot travel in a vacuum using the bell jar experiment as an example.	I can describe p.s. and respiration in plants and animals in detail and its relation to e.s.	I am able to give examples of compounds found in the crust and that they are oxides.

		I can give examples of exo & endothermic reactions.	I can explain in detail how blood cells are produced in the bone marrow. (The skeletal and muscular systems.)		I can describe the transfer of energy through the ecosystem including: calculating energy transfer, pyramids of biomass and energy transfer in KJ.	
		Explain conservation of mass and energy change.	I can draw the cross section of a bone and describe the inner and outer layer. (The skeletal and muscular systems.)		I can explain the term interdependent.	
		I can give word and symbol and word equations of complete & incomplete combustion.	I know that when a muscle contracts it pulls the bone by applying a force. (The skeletal and muscular systems.)		I can explain in detail the build up of toxins in an ecosystem describing why top animals are most effected.	

	I can describe the difference in speed, movement and medium of travel in l, s and water waves.	I can describe how to produce a saturated salt after a neutralisation reaction.	I can explain what antagonistic means in relation to muscles. (The skeletal and muscular systems.) I can name a range of muscles and joints and can draw and locate several different joint types. (The skeletal and muscular systems.) I can calculate moments and know how muscles act as levers. (The skeletal and muscular systems.) I can use the equation: force = moment over p.distance. (The		I can describe factors affecting food security and alternatives to insect pollination and their pros/cons. I can describe government initiatives to conserve pollinators.	

			skeletal and muscular systems.)			
	I can draw accurate diagrams showing light reflection/ transmission and absorption.	I can give symbol equations for several neutralisation reactions.	I know muscles also maintain posture and body position. (The skeletal and muscular systems.)	I can work out a range of results when waves meet and explain the term superposition.		I can name more than 6 metals in the r.s. ad can place carbon correctly.
			I can label a diagram to show 10 components of the r.s. (Gas exchange- animals and plants.)			
			I can explain the adaptations of the lungs for gas exchange. (Gas exchange- animals and plants.)			
			I can explain inhalation and exhalation in detail including explaining pressure. (Gas			

			exchange- animals and plants.)			
	I can demonstrate angle of I= angle of r using a light ray diagram (accurate.)		I can explain diffusion in relation to g.e. (Gas exchange- animals and plants.)			
			I can explain the advantages of exercise to the r.s. and how the body is more efficient. (Gas exchange- animals and plants.)			
			I can interpret lung volume graphs. (Gas exchange- animals and plants.)			
			I can explain asthma in detail and what to do when an attack occurs. (Gas			

			exchange- animals and plants.)			
	I can describe how an image is formed in a mirror including change of perspective.	I can give equations for the reaction of acids with metals and can explain reactions and reactivity in relation to the reactivity series.	I cam describe bronchitus and emphysema in detail. (Gas exchange- animals and plants.)	I can use the microphone and loudspeaker as examples and relate how they work to our ears.		I know the equation for the extraction of iron from iron oxide.
			I can name all parts of the d.d. in the correct order. (Digestion.)			
			I know enzymes speed up chemical reactions and can name two digestive enzyme and organ of origin. (Digestion.)			
			I can define the term 'biological catalyst.' (Digestion.)			

	I can describe in detail and with diagrams- refraction.		I can describe how food is broken down chemically and mechanically in the mouth. (Digestion.) I can describe the process of absorption in the s.i. and can relate this to structure. (Digestion.) I know what happens to digested food once it is in the blood. (Digestion.) I can describe photosynthesis in detail with related equations. (reactants and products.) (Digestion.)			

	I can describe how the eye works and name the main features including energy transfers/ the retina and other light sensitive materials (camera.)	I can explain displacement	I can give examples of minerals def. in a plant. (Digestion.)	I can explain transverse and longitudinal waves in detail.		I can give a detailed analysis of the properties of ceramics, polymers and composites.
			I can explain why leaves have stomata. (Digestion.)			
			I can give detailed description of the function of each food type. (Nutrition.)			I can give a variety of examples of the uses of these materials with reasons.
			I can describe the function of vitamins and minerals in our diet. (Nutrition.)			
	I can explain why light is dispersed in its order.		I can define the meaning of deficiency disease and give several examples. (Nutrition.)	I can explain how ultrasound works and give a wide range of uses.		I can explain polymerisation as an addition reaction and give an example.
			I can explain why water is important			

			for the body. (Nutrition.)			
	I can explain reflection and absorption in detail.		I can use the BER equation to work out more complex energy requirement calculations. (Nutrition.)			I can give an example of a natural and a synthetic polymer.
			I can explain in detail why people need different amounts of energy. (Nutrition.)			
	I can develop a line of enquiry for investigation based on observations of the real world and prior scientific knowledge. I can make a prediction using prior scientific knowledge and by using scientific language. I can select and plan the most appropriate type of scientific enquiry to test predictions and can identify control, independent and dependent variables from this (using these terms correctly). I can proficiently and safely use a range of equipment, materials and techniques to complete laboratory and fieldwork.					

	I understand basic chemical nomenclature for simple compounds and can balance a simple equation. 9 - I can use and derive simple equations in a range of topics independently and carry out calculations accurately and round these appropriately. I can explain and understand the terms Continuous, Discrete, Qualitative and Quantitative and can collect and analyse this data appropriately. I can use a wide range of mathematical techniques and concepts to calculate results. I can independently choose the appropriate way of presenting my data including use of a wide range of graphical representations. I can describe in detail patterns in data collected and can use a wide range of observations and measurements to draw conclusions. I can present a detailed and reasoned explanation of scientific processes and can do this in relation to data collected and when reviewing my prediction and hypotheses. I understand the terms random and systematic error and can identify where/why these may occur in data and give reasons for this. I can closely analyse my results formulating questions and new/further hypotheses from this. I can explain the term "reproducibility" and use this understanding to plan investigations accordingly. I can explain in detail several scientific theories that have been modified in the light of new evidence & can describe the process of and reason behind the publishing of results and peer review.

	I can independently complete a full risk assessment of practical work & identify preventative strategies.