Primary Progression in Science

Scientific Disciplinary Knowledge & Prior Learning

EYFS (Development Matters): Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them.

KS1 (National Curriculum): pupils should be taught the following scientific methods, processes and skills: asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests, identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions

KS2 (National Curriculum): pupils should be taught the following scientific methods, processes and skills: planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary, taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate, recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs, using test results to make predictions to set up further comparative and fair tests, reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations, identifying scientific evidence that has been used to support or refute ideas or arguments

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Questioning	Ask simple questions about the world around them.	Ask questions and know some can be answered using scientific enquiry.	To explain that questions can be answered in different ways.	To use straightforward scientific evidence to answer questions or to support their findings.	To report on findings from an enquiry.	Raise scientific questions and hypothesise.	Plan an enquiry that will answer a question.
Observing	Make observations and pictures. Talk about similarities and differences.	Observe changes over time.	Measure and observe changes over time.	Make systematic and careful observations using appropriate equipment.	Make accurate, systematic and careful observations using appropriate equipment.	Take accurate and precise measurements.	Take accurate and precise measurements taking repeat readings when appropriate.
Classifying	Explore objects around them.	Group familiar objects.	Group and compare familiar objects	Classify familiar objects.	Use simple classification keys to classify familiar objects.	Use complex classification keys, identifying causal relationships.	Create classification keys, identifying evidence to support or disprove causal relationships.
Investigating		Carry out simple class comparative tests with support.	Carry out simple group comparative tests.	Carry out comparative tests that include making a prediction.	Carry out comparative tests that include making a prediction and controlling independent variables.	Design and carry out comparative and fair tests that include making predictions, controlling variables and results.	Design and carry out comparative and fair tests that include making predictions, controlling variables and asking further questions based on results.
Researching	Listen to stories with Science links and discuss what they hear	Find information from given simple sources.	Find and select information from given simple sources.	Research relevant information from a range of sources.	Research relevant information and select from a range of sources.	Explore how scientific evidence has changed over time.	Identify evidence that supports or disproves an idea.
Recording	Draw pictures.	Draw simple diagrams.	Draw simple diagrams and create scientific models.	Use labelled diagrams and scientific models. Use keys, bar charts and tables.	Create labelled diagrams and scientific models. Use keys, bar charts and tables.	Evaluate diagrams and models. Use tables, scatter, bar and line graphs.	Create and evaluate diagrams and models. Use tables, scatter, bar and line graphs.
Concluding	Explain simple 'why' and 'how' questions.	Describe what has been observed.	Describe what has been observed and explain why.	Explain observations using scientific vocabulary and explain why.		Evaluate predictions against results, using scientific vocabulary, and begin to identity causal relationships. Begin to discuss reliability of data	

Deeper Thinking EYFS/KS1:

Can suggest ways of finding out through listening, hearing, smelling, touching and tasting
Say whether things happened as they expected and if not why not Can independently consider controlling variables to make a fair test
Can explain what they have found out using scientific vocabulary
Can they make accurate measurements using nonstandard measurements i.e. multilink

Deeper Thinking KS2:

Can observe and ask questions based on own observations before suggestion of an area to test further
Can choose the best way to answer a question and use information from different sources to plan an investigation
Can use test results to make further predictions and set up further comparative tests
Can explain how they could improve their way of working
Can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentation

Scientific Substantive Knowledge & Prior Learning

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants						
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees		Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • Investigate the way in which water is transported within plants • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal			
Animals, including Humans						
Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	• Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • Identify that humans and some other animals have skeletons and muscles for support, protection and movement	• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	Describe the changes as humans develop to old age	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans
Living Things and their Habitats						
		Explore and compare the differences between things that are living, dead, and things that have never been alive • Identify that most living things live in habitats to which they are suited and		Recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment •	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Describe the life process of reproduction in some plants and animals	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and

		describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Identify and name a variety of plants and animals in their habitats, including microhabitats • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food		Recognise that environments can change and that this can sometimes pose dangers to living things		animals • Give reasons for classifying plants and animals based on specific characteristics
Materials						
	Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Describe the simple physical properties of a variety of everyday materials • Compare and group together a variety of everyday materials on the basis of their simple physical properties	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching			Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Demonstrate that dissolving, mixing and changes of state are reversible changes • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	
Rocks, Evolution and Inheritance						
		Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soil is made from rocks and organic matter.				Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to Evolution.
States of Matter						
Notice properties of everyday materials, e.g. waterproof, floats/ sinks.				Compare and group materials together, according to whether they are solids,	Compare and group together everyday materials on the basis of their properties,	

				liquids or gases • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Light, Sound and Hearing						
			Recognise that they need light in order to see things and that dark is absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect the eyes. • Recognise that shadows are formed when light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows changes	Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases		Recognise that light appears to travel in straight lines. •Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. •Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. •Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Seasonal Change & Earth and Space						
Understand changes in the seasons through observations.	Observe changes across the 4 seasons • Observe and describe weather associated				Describe the movement of the Earth and other planets relative to the sun in the solar	

	with the seasons and how day length varies				system • Describe the movement of the moon relative to the Earth • Describe the sun, Earth and moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	
			Electricity			
				Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Identify whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators and associate metals with being good conductors.		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.
			Forces and Magnets			
			Compare how things move on different surfaces. • Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. • Describe magnets as having 2 poles. • Predict whether 2 magnets will attract or repel each other,		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving Surfaces. • Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	

			depending on which poles are facing.			

Misconceptions:

- https://pstt.org.uk/resources/common-misconceptions/