Progression in Science – Sheering C. of E. Primary School

'Science is part of the reality of living; it is the what, the how and the why of everything in our experience.'
Rachel Carson

INTENT

Children learn science to gain a greater understanding of who we are and the world around us. Through this curriculum you will see that we start with what's close to us (ourselves) and explore from basic organisms of plants all the way to complex life, to space and beyond. Over the course of the two years' knowledge is built upon forming a spiral curriculum, as each term progress the expectations of children should build upon previous knowledge and their expectations of the world around them. The scheme of work makes broader links to the rest of the curriculum e.g. history, geography. This allows students to gain a broader understanding and enable them to make cross-curricular links to deepen learning and follow embed new skills. Student should be supported in lessons through differentiation allowing scaffolding for weaker students with the help of teaching assistants. The teacher should provide challenge for more able children in the form of next steps and challenge questions. To build on knowledge and encourage independent learning, students are also required to research a scientist which allows them to take ownership of their work and be able to explore an area of interest; making real world links. Enrichment ideas allow students to explore science in the real world, conducting experiments, forming hypothesis and being able to form conclusions; allowing deeper understanding on the skills that have already been taught.

Key features and expectations revolve around nurturing curiosity, building foundational knowledge and developing scientific skills through exploration and hands on learning

Key Features:

- Encouraging students to ask questions and explore their natural curiosity about the world
- Learning through experiments, models and real world exploration
- Emphasis on skills like observation, prediction, conclusion, classification, measurement and data recording
- Introduce fundamental concepts in biology, physics, chemistry and earth science
- Key vocabulary is highlighted and explicitly taught within the lesson – developing the ability to use and understand basic scientific terms and languages
- Recapping of prior knowledge
- Pre and post learning tasks or enquiry questions
- Develop skills in logical thinking and problem solving
- Relate scientific concepts to daily environment and experiences – promoting an awareness
- Celebrating British Science Week
- Weekly STEM and Science Clubs
- Use resources and tools, some which are loaned, to carry out scientific experiments

Expectations:

- Each lesson has the long date and a learning question written or labelled in their books which is the focus of the lesson
- Taught weekly
- Learning is recorded in many different ways; science book; photographic evidence (tapestry); use of art; digital technology
- Science display in the classroom on
- Develop questions, make observations and think critically about what they observe
- Engage in practical activities such as observing, measuring and recording results
- Understand basic ideas, like plant and animal life cycles, states of matter, forces and motion, and the water cycle.
- Use basic tools and techniques, make predictions, observe accurately, record data and communicate findings clearly – cross curricular to Mathematics and English writing
- Analyse information, consider different solution and understand te implications of their findings.
- Recognise how science is present in everyday life, such as understanding seasons, how food grows and why recycling is important – cross curricular to PSHE, geography

EYFS links:
Understanding the World
In Reception

- 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.

The Natural World ELG

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities & differences between the natural world around them and contrasting environments, drawing on their experiences & what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

WORKING SCIENTIFICALLY					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
ask simple questions and recognise that they can be answered in different ways observe closely, using simple equipment perform simple tests identify and classify use their observations and ideas to suggest answers to questions gather and record data to help in answering questions.	ask simple questions and recognise that they can be answered in different ways observe closely, using simple equipment perform simple tests identify and classify use their observations and ideas to suggest answers to questions gather and record data to help in answering questions.	ask relevant questions and use different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use results to draw simple conclusions, make predictions for new values,	ask relevant questions and use different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use results to draw simple conclusions, make predictions for new values,	plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs use test results to make predictions to set up further comparative and fair tests 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 presentations	plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs use test results to make predictions to set up further comparative and fair tests 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 presentations

		suggest improvements and raise further questions identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings	suggest improvements and raise further questions identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings	identify scientific evidence that has been used to support or refute ideas or arguments	identify scientific evidence that has been used to support or refute ideas or arguments.

ANIMALS INCLUDING HUMANS - Biology					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
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, incl. pets) identify, name, draw, label 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	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	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 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

PLANTS - Biology		
By the end of Key Stage One, children should be able to;	**By the end of Lower Key Stage 2, children should be able to;**	

Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
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 requirements of plants for life and growth (air, light, water, nutrients from soil, 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			

LIVING THINGS AND THEIR HABITATS - Biology					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
	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 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 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 recognise that environments can change and that this can sometimes pose dangers to living things.	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 animals give reasons for classifying plants and animals based on specific characteristics **Also:** **EVOLUTION AND INHERITANCE** 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

MATERIALS – Chemistry

By the end of Key Stage One, children should be able to;		By the end of Lower Key Stage 2, children should be able to;		By then end of Upper Key Stage 2, children should be able to;	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
EVERYDAY 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.	**USES OF EVERYDAY MATERIALS** 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		**STATES OF MATTER** compare and group materials together, according to whether they are solids, 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	**PROPERTIES AND CHANGES OF MATERIALS** compare and group together everyday materials on the basis of their properties, including: hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know 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, gases to decide how mixtures might be separated, including through filtering, sieving, 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 & 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 - Physics					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
		recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be		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	

		dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change		use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	

ELECTRICITY - Physics					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
			identify common appliances that run on electricity construct a simple series electrical circuit, identifying/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		**Electricity** 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 - Physics					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
		compare how things move on different surfaces notice that some forces need contact between two 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 two poles predict whether two magnets will attract or repel each other, depending on which poles are facing		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	

OTHER – Physics/Chemistry					
By the end of Key Stage One, children should be able to;		**By the end of Lower Key Stage 2, children should be able to;**		**By then end of Upper Key Stage 2, children should be able to;**	
Cycle A	**Cycle B**	**Cycle A**	**Cycle B**	**Cycle A**	**Cycle B**
Seasonal Changes observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies		**Sound** 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	**Rocks** 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 soils are made from rocks and organic matter		**Earth and Space** describe the movement of the Earth, and other planets, relative to the Sun in the solar 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

		recognise that sounds get fainter as the distance from the sound source increases			

Cycle A

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Durrington	Animals including humans – Offspring to Adults **Biology**	Seasonal Changes **Physics**		Plants (y1) **Biology**	Materials- Everyday materials **Chemistry**	
Fitzwalter	Animals including humans – Digestive System **Biology**		Materials- States of Matter **Chemistry**	Rocks **Physics/Chemistry**	Forces – y3 **Physics**	Sound **Physics**
Quickbury	Animals including humans – Stages of Human Development **Biology**	Living things and their habitats – Making new plants **Biology**	Forces **Physics**	Materials- Properties and changes of materials **Chemistry**		Light **Physics**

Cycle B

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Durrington	Animals including humans – Animals all around **Biology**		Living things and their habitats (y2) **Biology**	Plants (y2) **Biology**	Materials- Uses of everyday materials **Physics/Chemistry**	
Fitzwalter	Animals including humans – Healthy Eating **Biology**	Living things and their habitats – Grouping living things **Biology**	Light **Physics**	Plants **Biology**	Electricity **Physics**	

Quickbury	Animals including humans – The Circulatory System **Biology**	Electricity **Physics**	Living things and their habitats – Classifying **Biology**	Evolution and inheritance **Biology**	Earth and space **Physics**