Science: Teaching Objectives (Whole School Overview) - Two Year Cycle
2023-2024 - All Classes Follow CYCLE B
2023-2024 - Nursery Follow CYCLE 1

The school's curriculum is planned and sequenced so that new knowledge and skills build on what has been taught before and towards its clearly defined end points.

The start and end of units do not always coincide with school half-term holidays. If National Curriculum statements for the unit have been covered and the pupils are secure, we move on to the next unit. The units that are spread across the year are ideally taught outside throughout the year.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS Working Scientifically	In the EYFS, the characteristics of effective learning from the Statutory Framework for the Early Years Foundation Stage are the foundations on which the working scientifically skills build in Key Stage 1. While children are playing and exploring, teachers should be modelling, encouraging and supporting them to do the following: • show curiosity and ask questions • make observations using their senses and simple equipment • make direct comparisons • use equipment to measure • record their observations by drawing, taking photographs, using sorting rings or boxes and, in Reception, on simple tick sheets • use their observations to help them to answer their questions • talk about what they are doing and have found out • identify, sort and group.					
Nursery Cycle 1	**Seasonal Changes/ Animals Inc Humans** ***All About Me*** ***Senses*** ***Autumn*** -Use all their senses in hands-on exploration of natural materials. -Begin to make sense of their own life-story and family's history. -Begin to understand the need to respect and care for the natural environment and all living things.	**Materials/ Animals Inc Humans** ***Fires & Fire Safety*** ***Dental Hygiene &*** ***Personal Hygiene*** -Explore how things work. -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things.	**Seasonal Changes** ***Winter*** -Understand the key features of the life cycle of a plant and an animal. -Use all their senses in hands-on exploration of natural materials.	**Plants/ Living Things and their Habitats** ***Planting Seeds &*** ***Growing Plants*** ***Life Cycles*** ***Animals & their*** ***Habitats*** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Plant seeds and care for growing plants. -Understand the key features	**Plants/ Living Things and their Habitats** ***Life Cycles*** ***Animal Types &*** ***Habitats*** ***Animal Facts*** -Plant seeds and care for growing plants. -Understand the key features of the life cycle of a plant and an animal. - Begin to understand the need to respect and care for the natural environment and all living things.	**Seasonal Changes Animals Inc Humans/ Materials** ***Differences &*** ***Changes in*** ***Materials*** ***Months of the Year*** ***Change in Time &*** ***Growing Up*** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Talk about the differences

				of the life cycle of a plant and an animal. - Begin to understand the need to respect and care for the natural environment and all living things.		between materials and changes they notice. -Explore how things work. -Explore and talk about different forces they can feel.
Nursery Cycle 2	**Seasonal Changes/ Animals Inc Humans** ***All About Me*** ***Senses*** ***Autumn*** -Use all their senses in hands-on exploration of natural materials. -Begin to make sense of their own life-story and family's history. -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things.	**Materials/ Electricity/ Animals Inc Humans** ***Fires & Fire Safety*** ***Dental Hygiene &*** ***Personal Hygiene*** -Explore how things work.	**Materials/ Electricity** ***Differences & Changes in Materials*** ***Explore Collections of Materials*** ***How Things Work*** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Talk about the differences between materials and changes they notice. -Explore how things work.	**Plants/ Living Things and their Habitats/ Animals Inc Humans** ***How Things Work*** ***Different Food Types*** ***Healthy Eating*** ***Baking Planting Seeds & Growing Plants*** ***Life Cycles*** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Talk about the differences between materials and changes they notice. -Explore how things work.	**Forces** ***Forces*** ***Speed*** ***Floating & Sinking*** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Talk about the differences between materials and changes they notice. -Explore how things work. -Explore and talk about different forces they can feel.	**Animals Inc Humans/ Force** ***Life Cycles*** ***Sealife & Creatures*** ***Changes in Materials*** ***Floating & Sinking*** ***Recycling*** -Use all their senses in hands-on exploration of natural materials. -Understand the key features of the life cycle of a plant and an animal. -Explore collections of materials with similar and/or different properties. -Talk about the differences between materials and changes they notice. -Explore how things work. -Explore and talk about different forces they can feel.
Reception	**Understanding The World - Early Learning Goals** -Explore the natural world around them, making observations and drawing pictures of animals and plants. -Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and 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.					

Reception Cycle A & B **Enhancements:** Mad Science Assembly RIS Assembly	**Animals inc Human** ***How I've Changed*** ***Body Parts*** ***The 5 Senses*** ***Autumn*** -Talk about members of their immediate family and community. -Name and describe people who are familiar to them. -Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, having a good sleep routine. -Explore the natural world around them. -Describe what they see, hear and feel whilst outside. -Recognise some environments that are different to the one in which they live. -Understand the effect of changing seasons on the natural world around them.	**Materials / Forces** ***Identifying Materials*** ***Using Magnets*** Neil Armstrong (Little People Big Dreams Book) -Explore the natural world around them. -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties.	**Seasonal Changes/ Materials/Forces** ***Winter*** ***Floating and Sinking*** -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. -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties.	**Living Things and their Habitats/ Materials** ***Life Cycle of a Chick*** ***Spring*** ***Materials*** -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things. -Understand the effect of changing seasons on the natural world around them. -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties.	**Living Things and their Habitats/ Plants** ***Exploring Maps,*** ***Local Area Walk,*** ***The 4 Seasons*** ***Life Cycle of a Plant*** ***How to Care for a Plant*** David Attenborough (Little People Big Dreams Book) - Draw information from a simple map. -Explore the natural world around them. -Describe what they see, hear and feel whilst outside. -Recognise some environments that are different to the one in which they live. -Plant seeds and care for growing plants. -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things. -Know and talk about the different factors that support their overall health and wellbeing: healthy eating	**Living Things and their Habitats/ Plants** ***Jurassic Coast,*** ***Fossils, Nature Walks, Minibeasts,*** ***Changes in Nature*** Mary Anning (Little People Big Dreams Book) - Explore the natural world around them. -Describe what they see, hear and feel whilst outside. -Recognise some environments that are different to the one in which they live. -Understand the effect of changing seasons on the natural world around them. -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things. - Draw information from a simple map.
KS1 Years 1 & 2 Working Scientifically	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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					

KS1 Years 1 & 2 Cycle A	**Y1 Plants, Y1 Animals inc Humans, Y1 Seasonal Change**					
KS1 Years 1 & 2 Cycle A **Enhancements:**	**Y1 Animals inc Humans (parts of the human body)** - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense *Elizabeth Garett Anderson (Physician and Surgeon)* *William Addis (Toothbrush Inventor)*	**Y1 Seasonal Changes** - observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies *Dr Steve Lyons (Extreme Weather)*	**Y1 & Y2 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 *Charles Mackintosh (Waterproof coat)* *Chester Greenwood (Earmuffs)*	**Y1 Animals inc Humans (animals)** - 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, inc. pets) *Chris Packham (Animal Conservationist)*	**Y1 & Y2 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	**Y1 & Y2 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 *Beatrix Potter (Author & Botanist)*
KS1 Years 1 & 2 Cycle B	**Y2 Living Things and their Habitats** **Y2 Plants (growing outside)**					
KS1 Years 1 & 2 Cycle B **Enhancements:** Mad Science Assembly	**Y2 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 describe how different habitats provide for the basic needs of different kinds of animals and plants,	**Y1 Seasonal Changes** - observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies *Holly Green (Meteorologist)* **Y1 & Y2 Plants (planning for growing**	**Y2 Animals inc Humans (basic needs and keeping healthy)** - 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 *Florence Nightingale (Pioneer of modern nursing in GB)* *Robert Winston (Human Scientist)*	**Y1 & Y2 Materials (outdoors)** - 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 *Charles Macintosh*	**Y2 Animals inc Humans (offspring)** - notice that animals, including humans, have offspring which grow into adults *Steve Irwin (Wildlife expert)* *Robert Winston (Human Scientist)*	**Y2 Living Things and their Habitats** - 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 *Rachel Carson (Marine Pollution)*

RIS Assembly	and how they depend on each other - identify and name a variety of plants and animals in their habitats, including microhabitats *Liz Bonnin (Conservationist)* *Jane Goodall (Primatologist)*	**seeds and bulbs outside)** - 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 *Agnes Arber (Botanist)*		*(Waterproof material)* *John MacAdam (Tarmac)*		**Y2 Plants (harvesting and cooking)** - 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 *Captain Cook (Botanists)* *Alan Titchmarsh (Botanist & Gardener)*
Lower KS2 Years 3 & 4 Working Scientifically	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.					
Lower KS2 Years 3 & 4 Cycle A	**Y3 Plants (gathering evidence of life cycles)**					
Lower KS2 Years 3 & 4 Cycle A	**Y3 Animals inc Humans** - 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	**Y3 Rocks and Soils** - 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	**Y3 Forces and Magnets** - 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	**Y3 Plants (parts and their functions and investigating growth)** - identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	**Y3 Light** - 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

Enhancements:	what they eat - identify that humans and some other animals have skeletons and muscles for support, protection and movement *Marie Curie (Radiation)* *Wilhelm Rontgen (X rays)* *Adelle Davis (Nutritionist)*	when things that have lived are trapped within rock - recognise that soils are made from rocks and organic matter *Mary Anning (Fossils)* *Dr Anjana Khatwa (Geologist)* *William Smith (Fossils)* *Inge Lehrmasn (Earth's Mantle)* *Katia Krafft (Geologist and Volcanologist)*	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 *Andre Marie Ampere (Electro-magnetism)* *The Wright Brothers (Airplanes)* *Henry Ford (Cars)*	- 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 *Joseph Banks (Botanist)*	- recognise that light from the sun can be 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 a solid object - find patterns in the way that the size of shadows change *Justus Von Liebig (Mirrors)* *James Clerk Maxwel (Visible and Invisible Waves of Light)* **Y3 Plants (life cycles)** - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal *Ahmed Mumin Warfa (Botanist)*
Lower KS2 Years 3 & 4 Cycle B	**Y4 Living Things and their Habitats (naming and identifying living things in the local environment)**				
Lower KS2 Years 3 & 4 Cycle B **Enhancements:** Mad Science Assembly	**Y4 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	**Y4 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	**Y4 Animals inc Humans (inc that animals and humans get nutrients from the food they eat)** - 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 - 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 *Joseph Lister (Antiseptic)* *Ivan Pavlov (Digestive System Mechanisms)* *Washington & Lucius Sheffield (Toothpaste)*	**Y4 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	**Y4 Living Things and their Habitats** - 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

RIS Assembly	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 *Michael Faraday (Magnets and Electricity)* *Thomas Edison (Lightbulb)* *Joseph Swan (Incandescent Light Bulb)*	cycle and associate the rate of evaporation with temperature *Joseph Priestly (Discovered oxygen)* *Lord Kelvin (Temperature)* *Anders Celsius (Temperature Scale)* *Daniel Fahrenheit (Temperature Scale)* *George Washington Carver (Chemist)*		- recognise that sounds get fainter as the distance from the sound source increases *Alexander Graham Bell (Invented telephone)* *Aristotle (Sound Waves)* *Gailileo Galilei (Frequency and Pitch of Sound Waves)*	*Jacques Cousteau (Marine Biology)* *Cindy Looy (Environmental Change and Extinction)* *Joean Beauchamp Procter (Zoologist)*
Upper KS2 Years 5 & 6 Working Scientifically	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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					
Upper KS2 Years 5 & 6 Cycle A **Enhancements:** Atherton High School Chester Zoo	**Y6 Animals inc Humans** - 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 *Leonardo Da Vinci (Anatomy)* *Santorio Santorio*	**Y5 Properties and Changes of Materials (properties of materials)** - 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 - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	**Y5 Forces** - 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 *Isaac Newton (Gravity)* *Albert Einstein (The Theory of Relativity)* *Galileo Galilei (Gravity and*	**Y5 Animals inc Humans** - describe the changes as humans develop to old age *Virginia Apgar (Obstetrical Anaesthesiologist)*	**Y6 Light** - 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	**Y5 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 *Margaret Hamilton (Computer scientist Moon Landings)*

	(Anatomist) *Dr. Katherine Dibb – (Cardiovascular Sciences)* *Justus von Liebig (Theories of Nutrition and Metabolism)* *Sir Richard Doll (Smoking)*	*Becky Schroeder (Fluorescence material)* *Spencer Silver, Arthur Fry and Alan Amron (Post-Its)* *Ruth Benerito (Wrinkle-Free Cotton)*	*Acceleration)* *Archimedes of Syracuse (Levers)*		*Thomas Edison (Light Bulb)* *Patricia Bath (Sight)* *Thomas Young (Wave Theory of Light)* *Ibn al-Haytham (Light and our Eyes)* *Percy Shaw (The Cats Eye)*	*Stephen Hawking (Black Holes)* *Mae Jemison (Astronaut)* *Claudius Ptolemy and Nicolaus Copernicus (Heliocentric vs Geocentric Universe)* *Neil Armstrong (First man on the Moon)* *Helen Sharman (GB Astronaut)* *Caroline Herschel (First to find a comet)*
Upper KS2 Years 5 & 6 Cycle B **Enhancements:** Mad Science Assembly RIS Assembly Atherton High School	**Y5 Living Things and their Habitats** - 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 *Jane Goodall (Naturalist)* *Sylvia Earle (Marine Biologist)* *Dr. Paula Kahumbu (Wildlife Conservationist)* *Mangala Mani (Antarctic scientist)* *Sir David Attenborough (Animal Behaviourist)*	**Y6 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 *Nikola Telsa (AC electric system)* *Alessandro Volta (Electrical Battery)* *Nicola Tesla (Alternating Currents)* *Edith Clarke (Electrical Engineer)*	**Y6 Living Things and their Habitats** - 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 *Carl Linneus(Classification)* *Libby Hyman (Classification Invertebrates)*	**Y6 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 *Hippocrates (Medicine) Charles Darwin (Evolution)* *Alfred Russell Wallace (Naturalist)* *Rosalind Franklin (DNA) Nettie Stevens (Geneticist, Evolutionary)*	**Y5 Properties and Changes of Materials (changes of materials)** - 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 - 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 *Sir Humphrey Davy (Separating gases)* *Jamie Garcia (Invention of a new plastic)*	