Science

National Curriculum Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Expected covered content from Key Stage 1

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

Year 1 programme of study

Plants

Pupils should be taught to:

- 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

Animals, including humans

Pupils should be taught to:

- 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

Everyday materials

Pupils should be taught to:

- 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

Seasonal changes

Pupils should be taught to:

- observe changes across the 4 seasons
- observe and describe weather associated with the seasons and how day length varies

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Year 2 programme of study

Living things and their habitats

Pupils should be taught to:

- 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

Plants

Pupils should be taught to:

- 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

Animals, including humans

Pupils should be taught to:

- 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

Uses of everyday materials

Pupils should be taught to:

- 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

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Knowledge Building
Processes and Changes
Change happens as a result of different **scientific processes.** Unlike in geography, where processes can be split into two distinct groups (physical and human), scientific processes can be wide-ranging. Some examples of these are: changing states of matter, growth of animals and plants and changing of one type of energy to another, such as using solar energy to product electrical power. These processes can be the subject of experimentation and changes can be observed, measured and recorded. Pupils will see how **processes and changes** work together, but how factors within the processes can affect changes.
Methods
In science, **methods** are a key part of seeking knowledge and answers to scientific problems. **Methods** are a logical way of organising scientific study and experiments so that ideas can be proven, answered and re-tested, if necessary. Most **methods** involve thinking of a hypothesis, testing that hypothesis then concluding and evaluating the results. Pupils will look at what makes a good scientific **method** and learn that using these **methods** makes for safer experimentation and leads to more reliable, accurate results.
Observing and Recording
At the most basic level, **observing and recording** is saying what you see and notice, and noting that down in some form. Being able to do this and decide what is significant is an important part of becoming a **scientist.** Progression involves using more technical equipment, then using observations and recordings to support theories, arguments and findings.
Scientific Vocabulary
The language of science can be broken down into various areas. Initially, basic language covers general science terms such as experiment, record, look, change etc. **Scientific vocabulary** then becomes more specific, depending on the area of science being studied, for example the language of biology could include animal, plant, reproduction, offspring, grow and the language of chemistry may use materials, chemical, change, liquid, gas etc. Finally, vocabulary can be used to link concepts together and be used in different contexts.
Uses and Implications
As with observing and recording, it is important to recognise that science takes place every day. Pupils will see that, even in mundane everyday activities, science is featured. Initially, it may only be the **uses** of science that are recognised but progression means they then explore how these **uses** have **implications.** For example, the use of single-use plastic, however useful to us as humans, has implications in environmental science terms.
Cross Curricular (STEM)
With links to **uses and implications,** children will see that science has strong ties to other areas of their learning, particularly maths and technology. The use of science within these subjects has strong implications for progression and development in all three.

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End Goals
Adventurers / LKS2
Our aim in teaching science in Adventurers is to encourage pupils to start to become more scientifically accurate, with the introduction of a range of testing, alongside the questioning and comparing of data when drawing conclusions. In this phase, pupils will have revisited a number of areas of science from Pathfinders, and will be expected to end this phase with a deeper understanding of them through the use of a wider scientific vocabulary and more complex investigative techniques. Pupils should be able to use more technical methods of grouping and classifying, such as classification keys and food chain diagrams. Pupils should also be able to present their findings from experiments in more formal ways and provide evidence for their findings. They should be able to explain the key features of the digestive and skeletal systems in animals and should have a deeper understanding of the reproductive processes of plants and their key parts. Pupils should be able to recognise the difference between volume and pitch when investigating sound and recognise how reflections are formed in the study of light. By the end of the phase, pupils should be able to make and draw diagrams of more complex electrical circuits that include switches. They should also be able to recognise the roles of conductors and insulators in making circuits functional but safe.
Navigators / UKS2
Our aim in teaching science in Navigators is to deepen pupils' knowledge and skills in a wide range of scientific areas. Pupils should now be confident in devising and conducting experiments and presenting their methods and findings with accuracy, using a range of different methods. In this phase, pupils are now expected to, not only ensure fair testing in their experiments, but also conduct comparative tests where appropriate. Pupils should be able to analyse, discuss and argue constructively for and against particular theories or ideas and use evidence to support their own views. They should be able to research and produce explanations or theories that look at scientific concepts beyond the classroom, such as evolutionary theories or the use of renewable energy sources. They should also know about the circulatory and the solar systems, as well as more complex forces such as gravity, water, air and frictional resistance.

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ADVENTURERS (Year 3 & 4)

Knowledge Building					
Processes and Changes	**Methods**	**Observing and Recording**	**Scientific Vocabulary**	**Uses and Implications**	**Cross-Curricular (STEM)**
To understand more complex scientific processes and know some factors that can affect change	To understand that methods are a key part of safe experimentation and have secure knowledge of the features	To know that clear observations and recordings support findings and prove theories	To know how scientific language learned relates to new science concepts and ideas	To understand how science affects our lives and the implications its use has on them	To understand that the links between science, technology, engineering and mathematics are key to many industries

Science Skills Progression – Adventurers Y3&4	
Sc15 Ask relevant questions	Sc25 Set up and carry out simple practical enquiries, comparative and fair tests
Sc16 With help, set up and carry out simple practical enquiries, comparative and fair tests	Sc26 Put forward ideas about testing and make predictions
Sc17 Suggest what might happen in comparative and fair tests	Sc27 Make close observations and comparisons
Sc18 Make careful observations and comparisons	Sc28 Observe patterns and suggest explanations
Sc19 Recognise what constitutes a fair test	Sc29 Collect data
Sc20 Identify simple patterns, changes, similarities and differences	Sc30 Recognise and explain why a test is fair or unfair
Sc21 Make measurements using standard units	Sc31 Identify simple trends to answer questions
Sc22 Discuss and describe findings	Sc32 Make accurate measurements using standard units and begin to think about why measurements should be repeated
Sc23 Communicate findings using simple scientific language in written explanations, drawing, labelled diagrams, keys, bar charts or tables	Sc33 Use scientific evidence to answer questions
Sc24 Use results to draw simple conclusions	Sc34 Use a range of equipment, including data loggers and thermometers
	Sc35 Gather and record findings through drawings, photographs, labelled diagrams, keys, models, presentations, tables, graphs and displays, using scientific language
	Sc36 Report on what the evidence shows through written explanations of results and conclusions and reports
	Sc37 Use results to draw simple conclusions, suggest improvements and raise further questions

NAVIGATORS (Year 5 & 6)

Knowledge Building					
Processes and Changes	**Methods**	**Observing and Recording**	**Scientific Vocabulary**	**Uses and Implications**	**Cross-Curricular (STEM)**
To understand that numerous factors can affect or prevent change	To know what makes a good methodology and explain how adaptations can lead to improvements	To identify, analyse and explain findings that support or dismiss theories or arguments	To know how to use a range of scientific vocabulary in various contexts	To know that science has implications for world issues and that it can be used for good or bad	To understand how their own STEM skills can benefit future science work in school and beyond

Science Skills Progression – Navigators Y5&6	
Sc38 Plan different types of scientific investigations	Sc50 Select and plan the most appropriate type of scientific enquiry to answer specific questions
Sc39 Make predictions based on scientific knowledge	Sc51 Make predictions based on scientific knowledge and understanding
Sc40 Carry out a range of scientific investigations	Sc52 Carry out a range of scientific investigations
Sc41 Begin to recognise and control variable where appropriate during investigations	Sc53 Recognise and control variables where appropriate during investigations
Sc42 Identify trends and patterns and offer explanations for these	Sc54 Identify scientific evidence that has been used to support or refute ideas
Sc43 Carry out a fair test explaining why it is fair	Sc55 Take measurements using a range of scientific equipment with accuracy and precision
Sc44 Take measurements using a range of scientific equipment with increasing accuracy and precision	Sc56 Decide when observations and measurements need to be checked, by repeating, to give more reliable data
Sc45 Understand why observations and measurements need to be repeated	Sc57 Select information from a range of sources
Sc46 Select information from provided sources	Sc58 Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, table, bar and line graphs, and models, making appropriate use of ICT
Sc47 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs	Sc59 Reporting findings from investigations, including written explanations of results, explanation involving causal relationships, and conclusions
Sc48 Produce written explanation of results, causal explanations and conclusions	Sc60 Present reports of findings in written form, displays and presentations
Sc49 Use results to make predictions for further tests	Sc61 Use test results to make predictions and set up further comparative and fair tests

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Year 3		T A F	L M	Rocky the Findosaur	Athens v Sparta	Under the Canopy	T G S	S K	Come Fly with Me! Africa
			Competency	NC Essentials			NC Essentials	Competency	
	Composite	**Key Knowledge Builder**							
Processes & Change	**To understand more complex scientific processes and know some factors that can affect change**			**Rocks:** Know that rocks have developed from other parts of organic matter, such as sand Know, in simple terms, how fossils are formed **States of Matter:** Know that evaporation and condensation play a key role in the water cycle Know that changes in temperature can affect how quickly condensation and evaporation happens	Know that the process of displacement has an effect on water level Understand that the mass of an object has an effect on the displacement of water	Know the life cycle of plants, including the process of pollination and seed dispersal Know how animals and environmental factors affect the pollination / seed dispersal process			Know that animals are part of food chains and this is how they gain the right type and amount of food Know that food chains and webs start with a producer followed by prey and predator
Methods	**To understand that methods are a key part of safe experimentation and have a secure knowledge of features**			**Rocks:** Know how to fairly test rocks for their different qualities, such as permeability Know how to pose an hypothesis about the properties of different rocks, using observation and touch beforehand **States of Matter:** Know how to safely experiment with evaporation and condensation Know how to produce detailed results following an investigation	Know that prediction is an important element and predict whether a range of materials will float or sink Understand why some materials float and why some sinks, using evidence to draw conclusions	Know how to conduct a fair test when growing a plant from seed by using the requirements for life Understand how plant species grow differently and how deprivation of certain life requirements can affect growth			Understand how food is processed through the digestive system by observation Know how to carry out a fair test showing the effects of sugar on teeth
Observing & Recording	**To know that clear observations and recordings support findings and prove theories**			**Rocks:** Understand how observation of fossils and their location can help us to determine what kind of creature it was Understand how, by observing and recording the properties of rocks and soils, we can check their suitability for different uses **States of Matter:** Know how to make clear recordings of the evaporation process to prove theories regarding temperature and if possible, wind speed Know how to use recordings and observations of evaporation and condensation to monitor changes	Observe and make recordings of floating and sinking objects Observe and record objects that sink or float using volume and mass recordings	Observe growth in plants and make some simple recordings Observe and record water transportation in plants and explain what can affect it			Know how to group things using classification Understand how classification keys are used to support findings about features of animals and plants
Scientific Vocabulary	**To know how scientific language learned relates to new science concepts and ideas**			**Rocks:** Know and use vocabulary relating to rocks and soil, such as "crumbling", "smooth" and "coarse" Know and use vocabulary relating to soil and rocks such as "permeability", "loamy" and "erosion" **States of Matter:** Know and use vocabulary relating to states of matter e.g; "molecule", "evaporate" and "condensation" Know and use vocabulary relating to states of matter, such as using Celsius as a measure of temperature and "precipitation"	Know and understand the terms 'buoyancy' and 'displacement' Know, understand and use the terms 'mass' and 'volume' appropriately	Know a range of vocabulary relating to the structure of flowering plants e.g. stigma, stamen Understand and use a range of vocabulary relating to the functions of flowering plants e.g. carbon dioxide			Know the names of the different types of teeth e.g. canine, incisor Know and use a wide range of vocabulary relating to digestion e.g. oesophagus

Use & Implications	**To understand how science affects our lives and the implications its use has on them**			**Rocks:** Know what a palaeontologist does and how their work helps us understand pre-historic creatures and plants Know how studying rocks and fossils in more depth and detail leads to greater understanding of the past **States of Matter:** Know why we add salt to ice on icy days Know why water conservation is important as the planet experiences global warming	Know that displacement is factored into the manufacture of boats and ships Understand why some boats and ships are manufactured to make them displace less water	Know that plants can require a wide range of growing conditions and can either thrive or die in various environments Know how environments can be managed to ensure successful plant growth and reproduction			Know that poor dental and digestive health can lead to problems in both animals and humans, such as weight gain Know that lack of the right food for animals in a food chain can have an impact on the biodiversity of an area
Cross Curricular (STEM)	**To understand that the links between science, technology, engineering and mathematics are key to many industries**			**Rocks:** Know a range of rock types that would be best suited to building structures Understand how different plants need different soils and, therefore, how humans can engineer soils to be best for food plants **States of Matter:** Know how to read a thermometer in Celsius and explain how it works (Maths) Know how to collate data from a thermometer to create a detailed graph (Maths)	Know how to make an object that floats e.g. boat (Design Technology) Know how to develop an object that floats so that is more efficient in water (Design Technology)	Know how to use data from plant experiments to create charts and graphs Know how to use data collected from plant experiments to suggest ways of improving plant growing conditions			Understand, in simple terms, how the medical industry works to protect our teeth Know how zoos and safari parks ensure animals get the right types and amounts of nutrition

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				Rocky the Findosaur In this unit, pupils will have the opportunity to devise a range of experiments to test some more complex scientific processes and observe changes, for example, the effects of erosion of various rock types. Pupils will use a range of scientific instruments such as hand lenses to observe rocks, fossils and soils at close range and thermometers to record more detailed results of changing state. They will compare the work of Mary Anning and Lorna Steel as part of this learning. Vocabulary relating to changes in rock, such as erosion and permeability, will be introduced as well as language relating to the water cycle. **NC Concepts** A. To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties B. To know and describe in simple terms how fossils are formed when things that have lived are trapped within rock C. To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (UKS2 NC) D. To know that soils are made from rocks and organic matter E. To compare and group materials together, according to whether they are solids, liquids or gases F. To know and observe how some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) G. To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature **Jiffy Science** **Define: States of Matter** Pupils will recall their knowledge and understanding of states of matter by producing a visual display sharing what they know. They will need to include how different types of matter can change through heating or cooling with some basic scientific understanding of how this occurs. • To identify differences, similarities or changes related to simple scientific ideas and processes • To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions **Materials on Trial** Once the pupils have made their posters in 'Define: States of Matter', they will then carry out tests on a range of materials for strength, solubility and magnetism. They will initially focus on thinking of two questions they would like to answer in their experiments. Once they have done this, they will carry out experiments to test the suggested materials and answer their questions. • To ask relevant questions and use different types of scientific enquiries to answer them • To set up simple practical enquiries, comparative and fair tests • To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • To gather, record, classify and present data in a variety of ways to help in answering questions	**Athens v Sparta** Pupils will expand their understanding of floating and sinking by initially taking part in a class discussion and then experimenting with a range of objects that may or may not float, making reasoned predictions before their investigations. The concept of displacement of will be introduced and further experiments will take place. Pupils will need to take photographs, record data and draw conclusions from their findings. **Concepts** A. To know that some objects float in water while some others sink B. To understand that displacement occurs when something is placed in liquid	**Under the Canopy** Pupils will continue to develop their understanding of flowering plants by dissecting and labelling the key parts of a plant. Pupils will be introduced to the processes of photosynthesis and water transportation in plants through experimenting and observing. They will have more in-depth class discussions on what plants need for survival and recognise that plants can vary enormously in how much of these elements they require. The reproduction of plants is explored in more depth through comparing how seeds are produced and then dispersed in different ways. **NC Concepts** A. To identify and describe the functions of different parts of flowering plants: roots, stem / trunk, leaves and flowers B. To learn about and 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 C. To investigate the way in which water is transported within plants D. To know and explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Jiffy Science** **Pollution Problem** Pupils will gather and record data from surveys on the problem of pollution and litter in their local area. After carrying out surveys on the local area and recording the pollution and litter types found, the pupils will need to write a report on their findings that can be shared with Professor Jiffy. Pupils will be encouraged to include diagrams with captions before writing a conclusion to their findings. • To gather, record, classify and present data in a variety of ways to help in answering questions • To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions			**Come Fly With Me! Africa** In this unit, pupils will further develop their understanding and knowledge of classifying living things through the use of classification keys. Pupils will, using research skills, investigate one of the 'Big Five' focusing specifically on their dietary requirements. Through observations and class discussions, pupils will learn about teeth in relation to diet and the digestive system of both humans and animals. Pupils will look at various skulls and skeletal systems using reasoned predictions and conclusions to identify which animal they belong to. Knowledge of food chains will also be advanced by, not only interpreting food chains, but by constructing them. **NC Concepts** A. To recognise that living things can be grouped in a variety of ways B. To understand and use classification keys to help group, identify and name a variety of living things in their local and wider environment C. To know 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 D. To know the different types of teeth on humans and their simple functions E. To know and describe the simple functions of the basic parts of the digestive system F. To know how to construct and interpret a variety of food chains, identifying producers, predators and prey G. To know that humans and some other animals have skeletons and muscle for support, protection and movement

Composites and Components – Skills and Knowledge

	Project 3 - NC Essential - Rocky the Findosaur	
	Composite	**Components**
Year 3	**To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (NC)**	To know that materials look and feel different and that these are known as their physical properties To know that rocks are found naturally, are solid and are made up of one or more minerals To know that a mineral is normally a solid material with a characteristic chemical composition that is naturally made and is found in rocks To know that some materials look like rocks, but they are man-made e.g. bricks To know that there are three main types of rocks – sedimentary, igneous and metamorphic To know that porous rocks have spaces or gaps in them that allow water to get in, often making the rock soft and crumbly To know that some rocks allow water to flow through and this is called permeability
	To know and describe in simple terms how fossils are formed when things that have lived are trapped within rock (NC)	To know that an animal or species is declared extinct when there is no reasonable doubt that the last individual member has died To know that a fossil is the preserved remains of a dead plant or animal To know that, after an animal dies, the hard parts like the skeleton are left behind and become buried in small particles of rock called the sediment To know that the sediment builds on top of the skeleton which, over millions of years, turns into a rock To know that, over time, water passes through the rock, dissolving the bones which are replaced by minerals To know that minerals leave a rock replica of the original bone called a fossil
	To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (NC) (UKS2)	To know that, over time, rocks can change shape or break because of wind, water or ice and this is called weathering To know that parts of the broken-down rock are then carried away in a process called erosion To know that fossils are rocks which have imprints of animals and plants that lived a long time ago To know that fossils show us how living things have changed since the time they were alive To know that we can use fossils to learn what extinct plants and animals looked like To know that a palaeontologist is a scientist who studies animals and plants that lived millions of years ago and are represented by their fossils e.g., Mary Anning
	To know that soils are made from rocks and organic matter (NC)	To know that soil is natural and is the top layer of the Earth's surface To know that soil is a mixture of living and non-living organic materials To know that organic materials are recently living organisms that are capable of decay To know that decay means to rot or break down into smaller pieces To know that not all soils look or feel the same, depending on their composition To know that clay soil is usually very sticky, has few air gaps and does not let water drain through it easily To know that sandy soil has large particles, so lots of air gaps which let the water drain through it easily, leaving it usually feeling dry
	To compare and group materials together, according to whether they are solids, liquids or gases (NC)	To know that materials look and feel different and that these are called their physical properties To know that solids keep their shape, can be held, cut or shaped To know that a liquid can flow or be poured easily and takes the shape of the container it is poured into, filling the same amount of space To know that gas is often invisible and does not have a fixed shape, spreading out to fill a container
	To know and observe how some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) (NC)	To know that temperature is a measure of how hot or cold something is To know that temperature can be measured using an instrument called a thermometer To know that Celsius is the unit of measurement we use to measure temperature To know that liquids change when they are heated up or cooled down To know that heating can melt a solid into a liquid To know that freezing can turn a liquid into a solid To know that if ice (solid) is heated, it changes into water (liquid) and this is called melting To know that if water (liquid) is cooled, it changes into ice (solid) and that this is called freezing To know that water freezes at 0°C
	To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature (NC)	To know that the water cycle is the journey water takes as it moves from the land to the sky and back again To know that when the sun heats up water on the land, it changes into a gas known as vapour and that this this process is called evaporation To know that when the water vapour rises into the air, it cools down and joins to make tiny drops of water, which make clouds, and that this is called condensation To know that, as the droplets of water in the clouds get bigger, they also get heavier and eventually fall as rain To know that when the water falls back onto land, it travels through streams and rivers back into the sea and the cycle starts again

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	Project 4 – Conflict – Athens V Sparta	
Year 3	**Composite**	**Components**
	To know that some objects float in water while some others sink NC	To know that heavy objects sink and light objects float To know that an object is floating when it is above the surface of the liquid To know that objects which contain trapped air are more likely to float To know that an object floats when the weight force on the object is balanced by the upward push of the water
	To understand that displacement occurs when something is placed in liquid NC	To know that when you put an object in water, the water is pushed out of the way and this is called displacement

	Project 5 - Conservation – Under the Canopy	
Year 3	**Composite**	**Components**
	To identify and describe the functions of different parts of flowering plants: roots, stem / trunk, leaves and flowers (NC)	To know that plants need roots, leaves and a stem To know that a root is the part of a plant that is underground To know that a root's main function is to anchor the plant in the ground and to absorb water and nutrients from the soil To know that the stem carries water and nutrients to different parts of the plant To know that the leaves are the green part of a plant that use sunlight to make their own food (photosynthesis) To know that a flower is the part of a plant that produces seeds, which become new plants To know that the main stem of a tree is called a trunk and this often splits into smaller branches
	To learn about and 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 (NC)	To know that all plants need air, light, water, nutrients (nourishment found in food) and the right temperature to grow healthily To know that plants come in many different shapes and sizes To know that some plants have flowers and others do not To know that rainforests are an important part of life on our planet To know that rainforests provide us with oxygen, which we need to breathe and help stabilise the Earth's climate
	To investigate the way in which water is transported within plants (NC)	To know that plants need water to survive To know that water is absorbed from the soil through the roots and carried up the stem To know that the stem contains small tubes that carry water to different parts of the plant
	To know and explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal (NC)	To know that when a plant grows from a seed it is called germination and that the stem, leaves and flowers emerge above the soil To know that pollen is a fine powder produced by plants so that they can make seeds To know that pollen is carried by insects or blown by the wind and that this process is called pollination To know that, when the pollen reaches another flower, it travels to the ovary, where it fertilises the egg cells which makes seeds, and that this process is called fertilisation To know that seeds are scattered by animals or the wind and that this is called seed dispersal To know that different plants have adapted to grow in different environments e.g. cacti in the desert To know how environments can be managed to ensure successful plant growth and reproduction e.g. farming

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	Project 8 - Culture – Come Fly with Me! Africa	
	Composite	**Components**
Year 3	**To recognise that living things can be grouped in a variety of ways (NC)**	To know that living things can be grouped as animals (including humans) or plants To know that animals can be grouped as vertebrates or invertebrates To know that vertebrates have a backbone/spine To know that vertebrates can be grouped as amphibians, reptiles, birds, fish and mammals To know that invertebrates do not have a backbone To know that amphibians are cold-blooded animals that live partly on the land and partly in water To know that reptiles are cold-blooded, have scaly skin and usually lay soft-shelled eggs To know that fish live in water and breathe through special organs called gills To know that mammals (including humans) are warm-blooded with hair
	To understand and use classification keys to help group, identify and name a variety of living things in their local and wider environment (NC)	To know that a classification key asks a series of questions to help group living things or objects in the natural world by their physical characteristics To know the names of a variety of living things in the local area and be able to identify them To know the names of a variety of living things in the wider environment and be able to identify them
	To know 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 (NC)	To know that a carnivore is an animal which only eats meat To know that a herbivore is an animal which only eats plants To know that an omnivore eats animals and plants To know that nutrition is the study of food and how it works inside your body To know that a food chain describes how plants and animals are linked by what they eat
	To know the different types of teeth on humans and their simple functions (NC)	To know that teeth are hard structures found in vertebrates to help them bite and chew food To know that Incisors are at the front of the mouth and help you to bite off and chew pieces of food To Know that canines are next to the incisors and are used for tearing and ripping food To know that molars are teeth at the back of the mouth and these help you to crush and grind food
	To know and describe the simple functions of the basic parts of the digestive system (NC)	To know that all living things need food, water and air to stay alive To know that the digestive system is the part of the body that helps to break down food for the body to process and use To know that food enters the digestive system as soon as you put it into your mouth To know that once food has been swallowed it travels down a tube called the oesophagus into the stomach To know that the stomach contains acid that kill any germs within the food To know that food then travels to the small intestine where food is broken down into nutrients that are absorbed into the blood To know that water is absorbed into the blood through the large intestine To know that any food that can't be absorbed is stored in the anus until we go to the toilet
	To know how to construct and interpret a variety of food chains, identifying producers, predators and prey (NC)	To know that a food chain describes how plants and animals are linked by what they eat To know that every living thing needs food to survive and, because of this, all living things are part of a food chain To know that animals eat plants or other animals to get their energy To know that a predator is an animal that hunts and kills other animals for food To know that animals that are hunted and eaten by animals are called prey To know that plants are at the beginning of most food chains because they make their own food, so they are called producers To know that plants get their energy from sunlight and that this is called photosynthesis To know that the animal at the top of the food chain is called the top predator To know that any changes in the food chain affects all living things, as they depend on each other (interdependence)
	To know that humans and some other animals have skeletons and muscle for support, protection and movement (NC)	To know that a skeleton is a framework of bones that supports the body and keeps it upright To know that the human skeleton is made up of bones which grow as we grow To know that the skeleton protects the softer body parts e.g the skull protects the brain, and the ribs protect the heart, lungs and other vital organs To know that muscles pull on the bones so that they can move To know that some bones have joints to make this movement easier e.g. elbow and knees

Science

Year 4		Lightning Speed	O & A	May the Force be with You	L & O	Picture Our Planet	W o t W	V W	Cry Freedom
			NC Essentials	NC Essentials			NC Essentials	Competency	
	Composite	Key Knowledge Builder							
Processes & Change	**To understand more complex scientific processes and know some factors that can affect change**	Know that circuits need to be complete in order for the components to work Understand how using a switch affects an electrical circuit		Know that magnets can attract or repel other magnets, depending on their poles Know that forces are affected by distance		Understand the link between the production of sounds and vibration and how sounds can be changed e.g. volume Know that sounds travel in order to reach our ears and that materials they travel through affect what we hear			
Methods	**To understand that methods are a key part of safe experimentation and have a secure knowledge of features**	Know how to safely experiment with basic components to make a circuit Understand how some components work within the circuit and how their use affects the effectiveness of it		Know how to make predictions and give reasons why they think some materials are not magnetic Know how to draw conclusions based on an experiment involving magnets		Understand the factors that can affect how well sound travels, through experimentation Know that sounds that are too loud can affect hearing so safety is important when experimenting with sound			
Observing & Recording	**To know that clear observations and recordings support findings and prove theories**	Identify parts of a circuit and know the effect of an open and closed circuit Know how to draw a simple circuit using correct symbols		Observe and record a range of magnetic materials from around the school Know how to use observations to prove hypotheses about magnetic and non-magnetic materials		Understand how to observe patterns between volume and vibration strength, and object features and pitch Know how to hypothesise regarding volume and vibration strength or object size and pitch and test them out, recording findings			
Scientific Vocabulary	**To know how scientific language learned relates to new science concepts and ideas**	Learn new vocabulary relating to electricity, such as 'components' and 'current' Know and understand a range of vocabulary relating to electricity such as 'circuit' and 'current'		Know and use language relating to magnets and force, such as 'attract' and 'repel' Know and use language relating to magnets and force, such as 'poles' and 'repulsion'		Know and understand the terms 'vibration', 'volume' and 'pitch' Know and understand the terms 'insulate' and 'sound waves'			
Use & Implications	**To understand how science affects our lives and the implications its use has on them**	Understand how important the availability and use of electricity is in our everyday lives Understand how electricity can make a range of appliances perform different tasks e.g. move, heat up, make a noise		Know that magnets are used in a range of industries Understand why magnets are important to a range of industries		Know that noise can be a pollutant in a similar way to light Understand how noise can be a pollutant and suggest some ways that this can be stopped or improved			
Cross Curricular (STEM)	**To understand that the links between science, technology, engineering and mathematics are key to many industries**	Know how simple conductors and insulators work and how they can keep us safe Know that metals in general are better conductors and begin to learn which are better conductors than others		Know how to design and make a fishing game using magnets (Design Technology) Know that magnets are used for lifting, holding, separating and moving (Engineering)		Know how factors can affect the travel of vibrations and explore ways these could be improved Know that we can send sound without wires/strings, through wireless sound systems			

Science

	Lightning Speed In this unit, pupils will learn in more depth about electrical appliances, using classification, and how circuits are essential to their functioning. Pupils are then required to use their previous knowledge of simple circuits to make and draw, using pictorial representations, a range of series circuits and identify the components used. They will need to produce and present an explanation of a circuit they have designed to solve a lighting problem in the local area. An introduction to the concepts of conducting and insulating will be introduced. **NC Concepts** A. To identify common appliances that run on electricity B. To know how to construct a simple series electrical circuit and demonstrate this, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers C. To 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 D. To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit E. To know and identify some common conductors and insulators, and associate metals with being good conductors		**May the Force Be With You** Pupils will embed their understanding of movement, revisiting push and pull forces, but extending this further by experimenting with the concept of friction. They will investigate the effects friction has on movement by designing an experiment that includes reasoned predictions, fair testing and conclusions. Pupils will explore the concept of gravity and other 'invisible' forces. They will also investigate magnets in a variety of ways such as through independent experiments, observing magnetic materials in their local environment and discussing how magnetic fields are found on Earth. The vocabulary of attract, repel and poles will be introduced. **NC Concepts** A. To know how things move on different surfaces B. To know that and observe how some forces need contact between two objects and some forces act at a distance C. To know that and observe how magnets attract or repel each other and attract some materials and not others D. To describe magnets as having two poles E. To predict whether two magnets will attract or repel each other, depending on which poles are facing F. To 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 **Jiffy Science** **Hockey Puck Ponderings** In this lesson, pupils will set up an experiment that measures the distance a 'hockey puck' (made a bottle top) skids across a frozen surface. They will need to consider the need for comparative and fair testing whilst carrying out their enquiries. They will need to work scientifically to carry out, observe and record their findings using standard units and the correct equipment for measuring length. • To set up simple practical enquiries, comparative and fair tests • To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • To use straightforward scientific evidence to answer questions or to support their findings		**Picture Our Planet** In this unit, pupils will learn about the concept of vibration in relation to how sounds are made, experimenting with tuning forks and observing the vibrations. They will further experiment with changing the volume of sounds by adapting the force used to produce them. Pupils will investigate how sounds travel to the ear and the concept of pitch will be introduced, linking to learning in music. **NC Concepts** • To identify how sounds are made, associating some of them with something vibrating • To know that vibrations from sounds travel through a medium to the ear • To recognise patterns between the volume of a sound and the strength of the vibrations that produce it • To identify patterns between the pitch of a sound and the feature of the object that produced it **Jiffy Science** **Here Comes the Band** With a link to music, pupils will produce their own musical instruments. They will, however, need to carefully consider the pitch of their instruments. They will design and then make their instrument but will need to share with the class, how their instrument works and the variations in pitch that it makes. • To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • To report on findings from enquiries, including oral and written explanations, displays or presentation of results and conclusions		**Cry Freedom** Pupils will learn through investigation that light can be reflected from a range of surfaces and these reflections are not a light source in themselves. They will also experiment, both independently and as a class, with how shadows can change size and shape depending on how close a light source is to the solid object, and how shadows can change size outside, depending on the location of the sun. **NC Concepts** A. To know that light is reflected from surfaces B. To find patterns in the way that shadows change

	Project 1 – Communication – Lightning Speed	
	Composite	**Components**
Year 4	**To identify common appliances that run on electricity (NC)**	To know that electricity is a form of energy To know that electricity is created by generators which are powered by a) non-renewable fuels, such as coal, gas and oil or b) renewable fuels, such as solar power and wind power To know that we use electricity to create light, heat, movement and sound To know how and why electricity is such an important part of our everyday lives
	To know how to construct a simple series electrical circuit and demonstrate this, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers (NC)	To know that electricity is a type of energy that can build up in one place or flow from one place to another To know that the flow of electricity is called the current To know that an electrical circuit is a complete route that an electric current can flow around To know that the components are the parts of an electrical circuit e.g. wires, bulbs, buzzers and motors To know that electricity can flow through lots of different components to make an electrical circuit To know that a circuit must be complete for all the components to work To know that all circuits need a power source such as a battery or cell To know that a switch is a device for opening and closing electrical circuits
	To 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 (NC)	To know how to identify the component parts of a circuit To know the effects of an open or closed circuit To know that the circuit needs to be closed for the lamp to light To know how to draw simple circuits using the correct symbols To know how to safely experiment with basic components to make a circuit
	To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit (NC)	To know that using a switch can stop the flow of electricity To know that if the switch is open there is no electricity flow To know that if the switch is closed then the electricity can flow, and the bulb will light up
	To know and identify some common conductors and insulators, and associate metals with being good conductors (NC)	To know that a conductor is a material that allows electricity to pass through it To know that many metals are good conductors e.g. iron, copper and steel To know that plugs and sockets include metal to allow the flow of electricity To know that an insulator is a material that does not allow electricity to pass through e.g. plastic, wood, glass and rubber To know that plastic is used to surround wires as an insulator to prevent us from getting an electric shock

Science

	Project 3 – NC Essential – May the Force Be With You	
	Composite	**Components**
Year 4	**To know how things move on different surfaces (NC) (Land Ahoy! KS1)**	To know that friction is a force between two surfaces that are sliding or trying to slide across each other To know that friction always slows a moving object down To know that the rougher the surface, the more friction is produced
	To know that and observe how some forces need contact between two objects and some forces act at a distance (NC)	To know that some things float and some things sink and this is because of density To know that objects that are denser will sink and those less dense will float To know that gravity is an invisible force that pulls things together To know that the Earth's gravity pulls things to the ground To know that when forces are balanced, things don't move
	To know that and observe how magnets attract or repel each other and attract some materials and not others (NC)	To know that magnetism is another force which is invisible, it is a non-contact force To know that magnetic forces can push or pull objects without touching them To know that when two magnets are close to each other, they create attracting (pulling) or repelling (pushing) forces To know that the forces are the strongest at the ends of the magnet To know that magnetic materials are made of metal, but not all metals are magnetic
	To describe magnets as having two poles (NC)	To know that the two ends of a magnet are called the north pole and the south pole
	To predict whether two magnets will attract or repel each other, depending on which poles are facing (NC) **To 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 (NC)**	To know that if you put two magnets together with the same two poles they will repel each other, which means they will push away from each other To know that if you put two magnets together with different poles they will attract each other, which means they will pull towards each other To know that magnetic materials are always metal To know that iron is magnetic, so any metal that contains iron is magnetic To know that steel is a metal that contains iron To know that not all metals are magnetic e.g. gold and aluminium

Science

	Project 5 – Conservation – Picture Our Planet	
	Composite	**Components**
Year 4	**To identify how sounds are made, associating some of them with something vibrating (NC)**	To understand that there are many different kinds of sound and sources of sound To know that vibration means the rapid backward and forward movement of a physical object To know that a sound is made when objects vibrate To know that the vibrations make the air around the objects vibrate and these air vibrations form sound waves
	To know that vibrations from sounds travel through a medium to the ear (NC)	To know that sound waves enter our ears, and we hear them as sounds To know that sound waves can travel through solids, liquids and gases to the ear To know that sound travels differently through different materials
	To recognise patterns between the volume of a sound and the strength of the vibrations that produce it (NC)	To know that the stronger the vibrations, the louder the volume To know that noise pollution happens when sounds become too loud for too long, which is harmful to our hearing
	To know that sounds get fainter as the distance from the sound source increases (NC) (Land Ahoy! KS1)	To know that the further we move away from a sound source, the quieter the sound becomes To know that the closer we move towards a sound source, the louder the sound becomes
	To identify patterns between the pitch of a sound and the feature of the object that produced it (NC)	To know that sound changes, depending on how fast or slow an object vibrates to make sound waves To know that sounds can be high or low and that this is called pitch To know that the pitch depends on the speed of the vibrations To know that when an object vibrates quickly, high-pitched sounds are heard To know that low-pitched sounds come from objects that vibrate more slowly

	Project 8 – Culture – Cry Freedom	
	Composite	**Components**
Year 4	**To know that light is reflected from surfaces (NC)**	To know that reflection involves a source of light bouncing off a surface To know that the light travels towards the surface and bounces off it To know that all surfaces reflect some light, but some surfaces reflect light better than others
	To find patterns in the way that shadows change (NC)	To know that light travels in straight lines and shadows are formed when anything blocks that light To know that the outline of a shadow is called a silhouette To know that the length of a shadow outdoors depends on how low or high the Sun is in the sky i.e. if the Sun is high, we see a shorter shadow To know that the closer a light source is to an object, the bigger the shadow will be

Science

Year 5		Mission Control	T R	Go with the Flow	Y N I	Full of Beans	B A t W	B B	Come Fly with Me! America
			Competency	NC Essentials			NC Essentials	Competency	
	Composite	**Key Knowledge Builder**							
Processes & Change	**To understand that numerous factors can affect or prevent change**	Know that the Earth orbits the sun and the Earth rotates, creating the change between day and night Know that the relationship between the Moon and the Earth causes the tides		Know how the human body changes as we age Understand that drugs / medicine can speed up and slow down the aging process, depending on what is taken		Know that the brightness of a bulb or volume of a buzzer can be changed by altering components Understand how the brightness of a bulb or volume of a buzzer is affected when components are changed			Know the basic changes that cotton undergoes as part of the manufacturing process Know that some man-made materials are made to be useable for items
Methods	**To know what makes a good methodology and explain how adaptations can lead to improvements**	Know how to explain a theory well by backing it up with evidence, such a diagrams and clear labelling Understand that learning about other methods can lead to adaptations and improvements		Know how to plan an investigation involving height and arm span, making hypotheses Know how to plan and carry out an experiment involving head circumference and height, drawing conclusions from observations		Know how to construct a circuit and introduce a larger number of or higher voltage of cells to make a bulb brighter Understand why it can be beneficial to use lower voltage bulbs in certain situations			Know how to develop an experiment based on cotton, showing a clear focus on one quality of the material Know how to improve an investigation through making adaptations e.g. change one thing
Observing & Recording	**To identify, analyse and explain findings that support or dismiss theories or arguments**	Know the basis of Copernicus's theory of planetary motion Know about the 'Flat Earth' theory and present basic evidence to support or dismiss this		Know how to make clear recordings for a range of body tests to support hypotheses and analyse health Understand how to make clear recordings for a range of body tests and link them to taking averages and making charts		Understand why some circuits work better than others by analysing the components being used Understand how a circuit can be improved to make it more efficient or produce more power			Understand, through observation, why cotton is a good material for moisture control in hot weather Discuss and compare materials, both man-made and natural, to explain why some materials are chosen for certain purposes
Scientific Vocabulary	**To know how to use a range of scientific vocabulary in various contexts**	Know and understand the terms 'orbit', 'spherical' and 'solar system' Know and understand the terms 'cycle', 'galaxy', 'constellations' and 'axis'		Know and understand the terms 'skeletal', 'digestive' and 'circulatory', relating to systems Know and understand the terms 'platelet', 'plasma', 'white blood cell' and 'red blood cell'		Know and understand the terms 'voltage' and 'circuit diagram' Use a wider range of vocabulary related to electricity, including interpreting symbols used in circuit diagrams			Know and understand the terms 'man-made', 'natural' and use in different contexts Know and understand the terms 'classify', 'criteria', 'properties', 'flexibility' and 'absorbency'
Use & Implications	**To know that science has implications for world issues and that it can be used for good or bad**	Know that the research of the Earth and Moon is used by space agencies and companies globally Know that research by global space agencies of the Earth, Sun and Moon develops our understanding of other planets		Know that being aware of your own health (resting heart rate etc.) is important Know how developments in understanding the human body has improved our health care system		Know about ways of producing energy that have a better global impact Know about renewable and non-renewable energy sources and give pros and cons for their use			Know that the cotton industry developed into a manufacturing process that involves many countries Understand how the cotton industry has had an impact on farming in the Americas
Cross Curricular	**To understand how their own STEM skills can benefit future science work in school and beyond**	Know how to put together a presentation of findings, share it with a group and prepare for questions Know how to put together an argument for a particular theory e.g. spherical Earth		Know how to make clear graphs and calculate averages (Maths) Know that companies design advertising campaigns to encourage consumers to buy their food and drink products (DT)		Understand how STEM has an impact on developing energy sources and consider ways of making their own energy sources Know how electricity gets to our homes and school and how it is measured			Explore ways of producing materials so they have a global benefit Know that technology is being developed to ensure manufacturing is becoming more environmentally friendly

Science

Mission Control

In this unit, pupils will look at the relationship between the Sun, Earth and Moon and how their movements and location in the solar system affect one another. Pupils will produce detailed labelled diagrams and written explanations, including graphs, to support their ideas. Pupils will deepen their knowledge of the Moon's relationship with the Earth, through self-directed research that will be shared with their peers for discussion.

NC Concepts

A. To know that the Sun, Earth and Moon are approximately spherical bodies
B. To know about and explain the movement of the Earth relative to the Sun in the solar system
C. To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
D. To know about and explain the movement of the Moon relative to the Earth

Jiffy Science

Solar System Searching

Pupils will develop their skills in using research to aid their scientific enquiries. Once they have carried out research into the solar system, pupils will need to present their findings in a way that is easy to read, contains images and captions and uses suitable scientific vocabulary. Pupils will also start to understand the need for citations when using quotes or statements from websites or books.

- To 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
- To identify scientific evidence that has been used to support or refute ideas or arguments.

What time is it, Professor Jiffy?

This lesson involves looking at how shadows work in helping to tell the time using sundials. Pupils will learn about how sundials work by looking at traditional round sundials but also the unusual 'Dolphin Sundial' at the Greenwich Observatory. They will make their own sundials and test them. Once tested, the pupils will need to present their findings, highlighting any issues with their sundials and how they could potentially be fixed.

To 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

Go With the Flow

Pupils will develop their understanding of growth and change in animals and humans by researching, sorting and comparing the gestational periods, life cycles and life spans of humans and animals. Using established research, pupils will investigate how diet, drugs and exercise can affect health and life expectancy in humans. The circulatory system will be introduced and pupils will investigate pulse rate, producing graphs to show their findings. They will investigate how vital water is for survival and compare how long animals can survive without water, discussing their findings with the class.

NC Concepts

A. To know and describe the changes as humans develop to old age
B. To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
C. To identify and name the main parts of the human circulatory systems, and explain the functions of the heart, blood vessels and blood
D. To describe the ways in which nutrients and water are transported within animals, including humans

Full of Beans

In this unit, pupils will further develop their knowledge and understanding of electricity. They will embed and extend their understanding of circuits by experimenting with variations of components, and the concept of voltage will be introduced through changing the number of cells in their circuits. They will also use scientifically correct symbols for components when completing circuit diagrams. They will now learn and use the correct symbols to represent components. Furthermore, pupils will look at energy, identifying its various forms (thermal, light, kinetic), how it is created through renewable and non-renewable sources and the implications this has on real-world use.

Concepts

A. To identify common appliances that run on electricity
B. To compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on / off positions of switches (NC)
C. To be able to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (NC)
D. To know how to use recognised symbols when representing a simple circuit in a diagram (NC)
E. To understand the term 'energy' and identify a range of different renewable and non-renewable energy sources

Come Fly With Me! America

Pupils will learn that objects are made from materials which are often combined e.g. a window is made of glass, wood and metal. They will look at objects, identify what they are made from and discuss why the chosen material is suitable for that object. Pupils will also differentiate between man-made and natural materials. With a focus on cotton wool, pupils will devise their own investigations to test either absorbency, flexibility or strength etc. They will be expected to produce a sound methodology and analyse their findings.

Concepts

A. To distinguish between an object and the material from which it is made
B. To understand the difference between man-made and natural materials and identify and sort both

Jiffy Science

Keeping Cosy

In this lesson, pupils will conduct an experiment that looks at the thermal properties of materials and their effectiveness at keeping a cup and its contents warm for the longest period of time. The focus will be on how the pupils set up their experiment, how they consider fair testing and how they then write up their enquiry, including how the data was collected and the conclusions drawn.

- To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- To use test results to make predictions to set up further comparative and fair tests

Melting Madness

'Keeping Cosy' and 'Melting Madness' work together as a pair of lessons. In this lesson, pupils will be given the instructions for three experiments. They will need to use the basic instructions to set up the experiments and carefully record the data that comes from them. Pupils will, before starting, need to consider what the variables could be with the three experiments and how to the best of their ability keep their tests fair.

- To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- To use test results to make predictions to set up further comparative and fair tests

Science

Composites and Components – Skills and Knowledge

	Project 1 – Communication – Mission Control	
Year 5	**Composite**	**Components**
	To describe the movement of the Earth and other planets relative to the sun in the Solar System (NC)	To know that the Sun is one star and that there are billions more stars similar to the Sun To know that the Solar System is made up of the Sun, the planets and all the other smaller objects that move around it e.g. asteroids and moons To know that there are eight planets that orbit (move around) the Sun and to be able to name them in distance order from the Sun i.e. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune To know that the further a planet is away from the Sun, the more days it has in a year and that this is because it takes longer to orbit the Sun To know that it takes the Earth 365 days to orbit the Sun
	To describe the movement of the Moon relative to the Earth (NC)	To know that the Moon is a large natural object that orbits the Earth To know that the Moon reflects light from the Sun and that is why we can see it To know that it takes 28 days for the Moon to orbit the Earth To know that, as the moon revolves around Earth, different portions of the moon's sunlit surface are visible from Earth To know that these changes in shape, when we appear to see more or less of the Moon, are called phases of the Moon To know that the Moon and Earth exert a gravitational pull on each other To know that the Moon's gravitational pull causes the oceans to bulge on both sides closest to and furthest from the Moon To know that these bulges create high tides
	To describe the Sun, Earth and Moon as approximately spherical bodies (NC)	To know how that a sphere is a ball shape To know the Earth orbits the Sun, and the Moon orbits the Earth To know that the Sun is bigger than the Earth and the Earth is bigger than the Sun
	To use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky (NC)	To know that, as the Earth orbits the Sun, it spins on an imaginary line called its axis To know that Earth's rotational axis is an imaginary straight line that runs through the North and South Pole To know that it takes 24 hours or one day to complete a rotation To know that, when parts of the Earth face the Sun, it's daytime To know that, when parts of the Earth are in the shade, its night-time To know that shadows are longer when the Sun appears lower in the sky i.e. early morning or early evening

Year 5	Project 3 – NC Essential – Go with the Flow	
	Composite	**Components**
	To describe the changes as humans develop to old age (NC)	To know that humans go through different stages of change, from baby to old age To know that human bodies change even from before we are born To know that it takes nine months for a human baby to develop in the womb To know that gestation means the development of a child or young animal while it is still inside its mother's body To know that different animals have different gestation periods To know that our bones continue to grow until we are about 25 years old To know that family genes influence how tall we grow To know that teenagers usually experience a 'growth spurt' as they reach puberty To know that puberty is the time when bodies change from childhood to adulthood To know that the changes in puberty are different for boys and girls To know that our skin becomes less elastic as we grow older and wrinkles form To know that often people, usually men, start to lose their hair as they get older
	To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (NC)	To know that diet means the food and drink consumed by humans and animals To know that, in order to grow and stay healthy, we need to eat certain types of foods To know that exercise helps our bodies to stay healthy To know that some drugs can help our bodies to stay healthy, but that some drugs also harm our bodies To know that food additives are substances added to food to maintain or improve its safety, freshness, taste, texture, or appearance To know that additives in foods are not always good for our bodies To know what it means to have a healthy lifestyle
	To identify and name the main parts of the human circulatory system, and describe the function of the heart, blood vessels and blood (NC)	To know that the bones in our bodies form a framework called a skeleton To know that the skeleton supports our body and protects the soft tissues inside To know that muscles are attached to our bones to help them move To know that the circulatory system is the body's system that moves blood around the body To know that the heart is a muscle that pumps blood around the body through blood vessels To know that red blood cells carry oxygen and essential nutrients around the body To know that white blood cells keep our bodies healthy by fighting bacteria To know that the smallest blood cells are called platelets which stick together to form blood clots which help stop bleeding To know that the watery part of the blood is called plasma
	To describe the ways in which nutrients and water are transported within animals, including humans (NC)	To know that living things, including humans, need water to stay alive To know that water is absorbed in the digestive system, alongside other nutrients To know that water is removed from the body by sweating and urinating To know that some animals are adapted to living in areas with very little water e.g. camels and desert cats

Year 5	Project 5 – Conservation – Full of Beans	
	Composite	**Components**
	To identify common appliances that run on electricity	To know that electricity is a type of energy that can build up in one place To know that electricity can flow from one place to another To know that the flow of electricity is called the current To know that we turn electrical energy into heat, movement, light or sound
	To compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on / off positions of switches (NC)	To know that a circuit is a complete path around which electricity will flow To know that components are parts of an electrical circuit e.g. bulbs, motors and buzzers To know that a circuit must be complete for the components to work To know that a switch is a device for opening and closing electrical circuits To know that the brightness of a bulb or volume of a buzzer can be changed by altering the components
	To be able to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (NC)	To know that voltage is the name for the electric force that pushes electrons through a circuit to produce electricity To know how to construct a circuit and introduce a larger number of, or higher voltage of cells to make a bulb brighter To know that more voltage is used when more components are added To know that a circuit can be improved by adding more voltage to make it more efficient or produce more power
	To know how to use recognised symbols when representing a simple circuit in a diagram (NC)	To know how to draw an accurate circuit diagram with standard symbols To know how to identify, from circuit diagrams, those circuits that will or won't work
	To understand the term 'energy' and identify a range of different renewable and non-renewable energy sources	To know that energy is how things change and move and that there are many different types of energy To know that thermal energy refers to heat To know that radiant energy refers to light To know that kinetic energy refers to movement To know that some sources of energy are natural, while some are man-made To know that non-renewable sources cannot be replaced when they run out and that they cause pollution e.g. oil, gas To know that renewable energy sources are unlikely to run out and these include solar power, hydropower, and wind power To know that the electricity we use is created by either non-renewable or renewable sources of energy To know that many renewable sources do not produce pollution and are better for the environment

Science

Year 5	Project 8 – Culture – Come Fly with Me! America	
	Composite	**Components**
	To distinguish between an object and the material from which it is made	To know that different materials have different properties which help us decide how they are to be used (To know which materials the native Americans used to build their homes and why)
	To understand the difference between man-made and natural materials and identify and sort both	To know that some materials have been made by man to replace natural materials e.g natural fabrics and synthetic fabrics To know that these are usually made in factories To know how to identify man-made materials To know how to identify natural materials

Science

Year 6		A World of Bright Ideas	T C	T T	Wars of the Worlds	Global Warning	I Y E	P Q	'I Have a Dream…'
			Competency	NC Essentials			NC Essentials	Competency	
	Composite	**Key Knowledge Builder**							
Processes & Change	**To understand that numerous factors can affect or prevent change**	Know that unsupported objects fall towards Earth because of gravity Know that air resistance affects the speed at which items fall towards Earth			Know how the position of the sun in the sky affects the size of a shadow Know that objects are seen through reflected or given out light and that a shiny surface reduces the absorption of light	Know that, while some materials can be changed and made into new materials, others cannot Know that some changes are not always reversible and explain why			Know that offspring can vary in appearance to its parents Know that animal reproduction can be more or less successful depending on external factors such as poor nutrition, climate change
Methods	**To know what makes a good methodology and explain how adaptations can lead to improvements**	Know how to carry out a fair test on air or water resistant objects Know how to provide a clear hypothesis and conclusion linked to an investigation and suggest improvements 'If we...'			Know how to make adaptations to create an experiment about shadows Understand how to use previous knowledge to support a methodology when conducting an experiment about light	Know how adaptations can be used in an investigation to separate solids and liquids Know that dissolving and mixing can often be reversible and, therefore, helpful when separating solids, liquids or gases			Understand how some animals have adapted to suit their environments and know the ways that some animals have done this Know what a biome is and understand how adaptations differ in different biomes
Observing & Recording	**To identify, analyse and explain findings that support or dismiss theories or arguments**	Know that simple pulleys, levers and gears make it easier to move larger or heavier objects using less force Know how to build a lever, pulley or gear system and explain how it is making it easier to move heavier or larger items			Understand how reflections work by exploring light and supporting findings with clear and concise diagrams and labels Know how to analyse and identify how light can be refracted	Know how to use a range of recording methods when sorting and analysing materials Know how to use comparative testing to sort materials and give evidence for placing materials in certain categories			Understand why animals, birds, plants and insects are classified and give reasons for such classifications Know the basic theory of evolution and compare it to alternative theories and arguments about the existence of life
Scientific Vocabulary	**To know how to use a range of scientific vocabulary in various contexts**	Know and understand the terms 'accelerate', 'decelerate', 'brake' and 'gravity' Know and understand the terms 'pulley', 'gear', 'spring' and 'resistance'			Know and understand the terms 'reflect', 'periscope' and 'transparent' Know the names of different parts of the eye and understand the terms 'refraction' and 'translucent'	Know and understand the terms 'recycling' and 'reusing' Know language that connects to other subjects to support scientific knowledge e.g. 'dredging ', ' pollution '			Know and understand the terms 'classification', 'hereditary', 'environment' and 'theory of evolution' Know a wider range of vocabulary relating to specific species, such as 'tendrils' and 'gills'
Use & Implications	**To know that science has implications for world issues and that it can be used for good or bad**	Find and describe other uses for pulleys, lever and gears in everyday situations Compare gear, lever or pulley systems in a range of everyday situations and find those that are most effective			Understand how periscopes work and how their use has been influential e.g. World War 1 Know that studying how light behaves can support a wide range of industries and technologies such as improving eye health	Know that recycling can change a material so it can be used for something else Know the process of recycling paper or glass and what can be made from these substances			Know that some animals are at risk due to changes in their biome and, therefore, reproduction rates and births are decreasing Understand how humans can affect habitats and biomes and know some solutions to help save animals and plants living there

Cross Curricular (STEM)	**To understand how their own STEM skills can benefit future science work in school and beyond**	Know how to make a useable pulley, lever or gear system Know how to use a Newton Meter and take measurements			Know that light is needed to make a range of objects work e.g. camera Know how adaptations have lead to improvements in the use and quality of light-emitting devices	Know how use ratios to create solutions (Maths) Know how to record findings correctly, using mathematical diagrams (Maths)			Know how to find more in-depth information about a specific animal, plant, insect or bird Understand that information needs to be relevant and carefully read to ensure that theories are supported by evidence

Science

		A World of Bright Ideas In this unit, pupils will research and present findings on Sir Isaac Newton and develop their understanding of gravity. Pupils will carry out a number of experiments on the effects of water, air and frictional resistance. The experiments will require reasoned predictions, accurate recording of data and will be shared with the class once complete. Finally, pupils will carry out investigations into mechanisms and use STEM skills to make and test them. Pupils will discuss how these mechanisms are used in everyday life. **NC Concepts** A. To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object B. To identify the effect of air resistance and friction, that act between moving surfaces C. To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect			**Wars of the World** Pupils will carry out a range of experiments to test the theory of light travelling in a straight lines, and the concept of refraction when creating rainbows. Pupils will observe what happens and record their findings appropriately. The structure of the human eye will be introduced with the correct vocabulary and pupils will create labelled diagrams. Finally, pupils will embed their knowledge of shadows by creating shadow puppet theatres, which will include the use of transparent, translucent and opaque materials. **NC Concepts** A. To understand that light appears to travel in straight lines B. To 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 C. To know that we see things because light travels from light sources to our eyes or from light sources to objects and then our eyes see them D. To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	**Global Warming** Pupils will explore changing states of matter in more detail. Initially, they will research the numerous factors and processes that are used to recycle glass and paper. Pupils will then have several opportunities to experiment with changing materials by the introduction of processes such as dissolving, filtering and evaporating etc. They will also test whether changes can be reversible. The experiments that the pupils will devise will require a greater focus on fair testing, using comparisons and retesting to ensure the data collected in accurate. Vocabulary such as substance, solution and mixture will be introduced. **NC Concepts** A. To know that some changes result in the formation of new materials, and that this kind of change is not usually reversible B. To compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets C. To suggest how mixtures might be separated, including through filtering, sieving and evaporating, using their knowledge of solids, liquids and gases D. To know how to demonstrate that dissolving, mixing and changes of state are often reversible changes E. To understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution F. To show understanding by giving reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic			**"I Have a Dream…"** Pupils will use their previous knowledge of life cycles to explore the similarities and differences between various animal and plant species. Based on specific criteria and questions, pupils will research the life and reproductive cycles of a variety of animals and plants with opportunity for analysis, discussion and comparison. Pupils will be expected to start to give more scientific reasoning for the groupings of plants and animals by using established classification systems. They will also start to investigate adaptations of various plants and animals to suit particular biomes and how some of these adaptations have led to evolutionary changes. **NC Concepts** A. To know the difference in the life cycles of a mammal, an amphibian, an insect and a bird B. To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents C. To be able to describe the life process of reproduction in some plants and animals D. To be able to classify plants and animals based on specific characteristics and give reasons E. To describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences F. To know and identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Science

Composites and Components – Skills and Knowledge

	Project 1 – Communication – A World of Bright Ideas	
	Composite	**Components**
Year 6	**To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (NC)**	To know that gravity is an invisible force that pulls objects towards the centre of the Earth To know that gravity keeps the Earth and the other planets in their orbits around the Sun To know that the gravity on the Moon is not as strong as gravity on the Earth because the moon is much smaller To know that it is the Earth's gravity keeps us on the ground and makes things fall To know that Isaac Newton was a scientist who was famous for his discoveries about gravity
	To identify the effects of air resistance, water resistance and friction, that act between moving surfaces (NC)	To know that friction is the resistance that one surface or object encounters when moving over another To know that air resistance is a type of friction between air particles and another material, making it more difficult to move through air To know that water resistance is a type of friction between water particles and another material, making it more difficult to move through water To know that streamlined objects are designed to reduce resistance e.g. shapes of cars, airplanes or boats
	To recognise some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect (NC)	To know that mechanisms, such as levers, pulleys and gears are devices that we use to help move things To know that a lever is a simple mechanism designed to lift objects To know that a pulley is a machine with a wheel and rope mechanism, designed to lift objects To know that a gear is a wheel with teeth that connects with other wheels to turn objects, control the speed of an object or help an object change direction To know that all of these mechanisms reduce the force you need to apply to lift or move heavy objects

	Project 4 – Conflict – Wars of the World	
	Composite	**Components**
Year 6	**To recognise that light appears to travel in straight lines (NC)**	To know that light is a form of energy To know that light travels in straight lines until it hits an object To know that shadows are formed when light is blocked by an opaque object
	To 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 (NC)	To know that, when we see an object, we are actually seeing the light bouncing off it To know that there are different parts to the human eye and these all have their own function
	To explain that we see things because light travels from light sources to our eyes off from light sources to objects and then to our eyes (NC)	To know that there are different parts to the eye and to be able to name them To know that the reflected light enters the eye through the opening in the iris called the pupil To know that the retina at the back of the eye is sensitive to light and changes the light into electrical signals which are sent to the brain To know that the brain interprets these signals as an image or picture
	To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (NC)	To know that, when an opaque or solid object comes between the light source and a surface, a shadow is formed To know that light travels in straight lines To know that the size of a shadow depends on how close the object is to the light source To know that if an object is close to the light source, it casts a big shadow To know that if an object is further away from the light source, the shadow is smaller

Science

	Project 5 – Conservation – Global Warning	
	Composite	**Components**
Year 6	**To know that some changes result in the formation of new materials, and that this kind of change is not usually reversible (NC)**	To know that some materials can be changed and made into new materials and others cannot and these include paper, cardboard, glass, metal, food and some rigid plastics To know that some changes are not always reversible i.e. materials cannot be changed back to how they were before e.g. when a piece of wood is burned To know that recycling means collecting materials that would otherwise be thrown away and using them to create new products To know that waste materials are a major cause of pollution, especially plastic waste which cannot be recycled e.g nurdles in the sea To know the impact of pollutants on different parts of the planet and identify which are not reversible
	To compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets (NC)	To know that, if you put a soluble material into water, it disappears e.g salt, sugar To know that some materials allow electricity to pass through them and these are called electrical conductors To know that an insulator is a material that does not allow electricity to pass through To know that some materials allow heat to pass through them and these are called thermal conductors To know that some materials keep heat from being lost e.g. wool To know that some materials are magnetic and give examples
	To suggest how mixtures might be separated, including through filtering, sieving and evaporating (using their knowledge of solids, liquids and gases) (NC) **To know how to demonstrate that dissolving, mixing and changes of state are often reversible changes (NC)**	To know that separating solids through a fine mesh is called sieving To know that materials can be separated by filtering, where an insoluble solid is passed through a very fine mesh or special paper (To know that filtering is used to turn wastewater into safe drinking water) To know that evaporation occurs when a liquid is turned into a gas To know that condensation occurs when a gas is turned into a liquid To know that dissolving and mixing can often be reversible and, therefore, helpful when separating solids, liquids or gases e.g. water can be a solid, liquid or gas
	To understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution (NC) **To show understanding by giving reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (NC)**	To know that a solution is a type of mixture where one substance is dissolved into another e.g. salt and water both dissolve in water to make a solution To know that we can reverse this by boiling water until it becomes steam and letting it evaporate, leaving behind the solid To know how adaptations can be made in an investigation to separate solids and liquids To know that observation is an essential part of scientific enquiry To know that it is important that the same method is used to measure the results of each test to ensure that it is fair To know how to draw conclusions from test-based evidence

Science

Year 6

Project 8 – Culture – "I have a dream…"

Composite	Components
To know the difference in the life cycles of a mammal, an amphibian, an insect and a bird (NC)	To know that a life cycle represents the stages a living thing goes through in its life, from birth to death To know that animals are small when they are born and, over time, they grow and their bodies change To know that most animals have babies of their own when they grow up, and the life cycle begins again To know that a mammal gives birth to its young which suckles on its mother's milk, has hair or fur on its body, and is warm-blooded To know that an amphibian lives partly in water and partly on land, has moist slimy skin and lays eggs To know that birds lay eggs, have feathers and wings and most can fly To know that an insect has a body with three segments that are protected by a hard shell, three pairs of legs and a pair of antennae To know that most insects produce eggs which are left to hatch into young
To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (NC)	To know that plants and animals produce offspring differently To know that the creation of offspring is called sexual reproduction and involves two parents, producing offspring that are genetically unique To know that to reproduce offspring, most animals need a male and a female To know that some living things lay eggs, which contain their offspring To know that some living things grow their babies inside them until they are developed enough to be born To know that all living things contain a material called DNA that carries all the information about how a living thing will look and function To know that living things produce offspring of the same species i.e. with the same pattern of DNA as their parents To know that offspring have some of the features of their parents, but are not born to be an exact copy of them To know that some living things produce offspring asexually which means there is only one adult involved in reproduction, and they reproduce an exact copy of themselves e.g. stick insects can reproduce asexually
To be able to describe the life process of reproduction in some plants and animals (NC)	To know that there are seven life processes common to all living things and these include nutrition, movement, growth, reproduction, sensitivity, respiration, and excretion To know that reproduction means producing offspring or babies within a life cycle To know that a life cycle is the process from birth, through to growing into an adult, through to reproducing when the process begins again To know that the life cycles of mammals, amphibians, insects and birds are different To know that mammals begin life growing inside the female adults until they are ready to be born To know that amphibians begin life as eggs and grow through different stages called metamorphosis To know that during metamorphosis, there is a series of physical changes an animal goes through to become an adult e.g. frog > egg > tadpole > frog To know that insects go through four stages of metamorphosis i.e. egg, larva, pupa and adult To know that larva is usually worm-like e.g. caterpillar To know that, at the pupa stage the larva builds itself a protective covering called a cocoon To know that, inside the cocoon, the larva develops its adult body parts To know that plants can reproduce by sexual reproduction and by asexual reproduction To know that sexual reproduction in plants involves the pollen from one flower fertilizing the egg (ovule) of another flower to produce a seed To know that germination happens when a plant seed begins to grow into a seedling, when the roots grow under the soil and the stem, leaves and flowers begin to emerge above the soil To know that plants that reproduce asexually produce an identical copy of themselves To know that asexual plants produce bulbs e.g. daffodils and tulips, or tubers e.g. potatoes To know that bulbs or tubers stay under the soil until they are ready to develop into new plants in the following year
To be able to classify plants and animals based on specific characteristics and give reasons (NC) **To describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences (NC)**	To know that classification is a system used by scientists to describe and group living things, according to common observable features To know that classification is based on similarities and differences To know that a vertebrate is an animal with a backbone (spine) To know that an invertebrate is an animal without a backbone (spine) To know the main differences between mammals, birds, amphibians, reptiles and fish To know the difference between seed-bearing plants and those that don't have seeds To know that very small living things are called micro-organisms e.g. bacteria
To know and identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (NC)	To know that some animals have adapted to suit their environments to increase their chances of survival To know that living things have adapted to their environments in many different ways e.g. change of body shape or colour To know that evolution is the theory that species have adapted to their environments To know that evolution involves changes in living things through many generations with the changes being passed on from adult to offspring

Science

Science Skills	Year 3								Year 4								
	That's All Folks	Lindow Man	Rocky the Findosaur	Athens Vs Sparta	Under the Canopy	Three Giant Steps	Saxon King	Come Fly With Me	Lightening Speed	Out and About	May The Force Be With You	Law and Order	Picture our Planet	Window on the World	Viking Warrior	Cry Freedom	seasons around the world
Sc15 Ask relevant questions			■	■	■			■	■		■		■			■	
Sc16 With help, set up and carry out simple practical enquiries, comparative and fair tests			■	■	■			■	■		■		■			■	
Sc17 Suggest what might happen in comparative and fair tests			■	■	■				■		■		■			■	
Sc18 Make careful observations and comparisons			■	■	■			■	■		■		■			■	
Sc19 Recognise what constitutes a fair test			■	■	■				■		■		■			■	
Sc20 Identify simple patterns, changes, similarities and differences			■	■	■			■	■		■		■			■	
Sc21 Make measurements using standard units			■	■	■				■		■		■			■	
Sc22 Discuss and describe findings			■	■	■			■	■		■		■			■	
Sc23 Communicate findings using simple scientific language in written explanations, drawing, labelled diagrams, keys, bar charts or tables			■	■	■			■	■		■		■			■	
Sc24 Use results to draw simple conclusions			■	■	■				■		■		■			■	
Sc25 Set up and carry out simple practical enquiries, comparative and fair tests			■	■	■				■		■		■			■	
Sc26 Put forward ideas about testing and make predictions			■	■	■				■		■		■			■	
Sc27 Make close observations and comparisons			■	■	■			■	■		■		■			■	
Sc28 Observe patterns and suggest explanations			■	■	■			■	■		■		■			■	
Sc29 Collect data			■	■	■				■		■		■			■	
Sc30 Recognise and explain why a test is fair or unfair			■	■	■				■		■		■			■	
Sc31 Identify simple trends to answer questions			■	■	■			■	■		■		■			■	
Sc32 Make accurate measurements using standard units and begin to think about why measurements should be repeated			■	■	■				■		■		■			■	
Sc33 Use scientific evidence to answer questions			■	■	■			■	■		■		■			■	
Sc34 Use a range of equipment, including data loggers and thermometers			■	■	■				■		■		■			■	
Sc35 Gather and record findings through drawings, photographs, labelled diagrams, keys, models, presentations, tables, graphs and displays, using scientific language			■	■	■			■	■		■		■			■	
Sc36 Report on what the evidence shows through written explanations of results and conclusions and reports			■	■	■				■		■		■			■	
Sc37 Use results to draw simple conclusions, suggest improvements and raise further questions			■	■	■			■	■		■		■			■	

Science

Science Skills

	Year 5								Year 6							
	Mission Control	The Rescuers	Go with the Flow	You're not Invited	Full of Beans	Been around the world	British Bulldog	Come Fly With Me	A World of Bright Ideas	True Crime?	Time Team	Wars of the World	Global Warning	In Your Element	Pharaoh Queen	I Have a Dream...
Sc38 Plan different types of scientific investigations			■		■			■	■			■	■			
Sc39 Make predictions based on scientific knowledge	■		■		■			■	■			■	■			■
Sc40 Carry out a range of scientific investigations			■		■			■	■			■	■			■
Sc41 Begin to recognise and control variable where appropriate during investigations			■		■				■			■	■			
Sc42 Identify trends and patterns and offer explanations for these	■		■						■			■	■			■
Sc43 Carry out a fair test explaining why it is fair			■		■				■				■			
Sc44 Take measurements using a range of scientific equipment with increasing accuracy and precision			■						■			■	■			
Sc45 Understand why observations and measurements need to be repeated			■						■			■	■			
Sc46 Select information from provided sources	■		■					■	■				■			■
Sc47 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs	■		■		■			■	■			■	■			■
Sc48 Produce written explanation of results, causal explanations and conclusions			■					■	■				■			
Sc49 Use results to make predictions for further tests			■					■	■				■			
Sc50 Select and plan the most appropriate type of scientific enquiry to answer specific questions	■		■		■			■	■				■			■
Sc51 Make predictions based on scientific knowledge and understanding	■		■		■			■	■			■	■			■
Sc52 Carry out a range of scientific investigations			■		■				■				■			
Sc53 Recognise and control variables where appropriate during investigations			■		■				■			■	■			
Sc54 Identify scientific evidence that has been used to support or refute ideas	■		■		■			■	■				■			■
Sc55 Take measurements using a range of scientific equipment with accuracy and precision			■						■			■	■			
Sc56 Decide when observations and measurements need to be checked, by repeating, to give more reliable data			■						■				■			
Sc57 Select information from a range of sources	■		■					■	■				■			■
Sc58 Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, table, bar and line graphs, and models, making appropriate use of ICT	■		■		■			■	■			■	■			■
Sc59 Reporting findings from investigations, including written explanations of results, explanation involving causal relationships, and conclusions			■					■	■			■	■			
Sc60 Present reports of findings in written form, displays and presentations	■		■					■	■				■			■
Sc61 Use test results to make predictions and set up further comparative and fair tests			■					■	■			■	■			