THAKEHAM PRIMARY SCHOOL

At Thakeham we CARE

courage
ambition
respect
enjoyment

CARE

KNOWLEDGE DEVELOPMENT OVERVIEW: Science

SUBJECT: SCIENCE

NATIONAL CURRICULUM

Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

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.

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

INTENT

It is our aim in Science that children are given opportunities to observe, record and draw conclusions about the world around them. We hope to introduce children to the basic elements of experiments and investigations, provide inspiration, nurture curiosity and make links to the real world in line with our Curriculum Drivers 'Inspired Learners' and 'Learning for Life'. There are natural links to our Super Learning Heroes such as 'Curious, Questioning Cleo' and 'Positive, Persevering Perry.'

Through our science curriculum we aim to:

- ensure that teachers meet their statutory obligations with regards to the teaching of Science.
- raise Science standards by promoting a high standard of excellence and consistency of approach amongst all staff.
- ensure procedures for planning and assessment enable a broad and balanced curriculum that has continuity and progression and addresses equal opportunities.
- foster a positive attitude to Science as an interesting and exciting part of the curriculum.
- encourage safe practice in all areas of Science.

Through teaching Science children are given opportunities to:

- develop their knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences.
- develop their ability to communicate their ideas using appropriate scientific vocabulary.
- acquire a curious and questioning mind.
- develop skills of observation and investigation.
- collect, retrieve, present and communicate their findings to others in a variety of ways.

EYFS

Understanding the World

The Natural World

ELG Children at the expected level of development will:

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

During the Early Years Foundation Stage, we teach science as an integral part of the topic work covered during the year. It is delivered through a hands on and practical approach, which makes links with topics and the Characteristics of Effective Learning. We relate the scientific aspects of the children's work to the objectives set out in the Statutory Early Years Framework. Science makes a significant contribution to one of the 7 areas of learning known as Understanding of the World but is also covered in Personal, Social and Emotional development and Maths. At the end of the Foundation Stage children's level of development is assessed against the Early Learning Goals as 'emerging' or expected'. By the end of the Foundation Stage children are expected to know about the similarities and differences in relation to objects, materials and living things. They can make observations of animals and plants, explain why some things occur and talk about changes. They are also aware of their own personal hygiene and how to look after their bodies.

IMPLEMENTATION

We use a variety of teaching and learning styles in Science lessons such as research, investigation, exploration, collaborative work and individual work. We share the learning objective, which is skills based, with the children. This may be introduced in a variety of ways. Our main aim is to develop children's scientific skills, knowledge and understanding through challenging, motivating activities that extend the pupils learning. This can be through whole class teaching, small group work, paired work, or independent learning. Science displays in each classroom are designed to encourage the children to develop enquiry skills.

Teachers plan opportunities for scientific enquiry in each lesson. This will cover one or more areas of investigation:

- Observing changes over time
- Comparative and fair testing
- Researching using secondary resources
- Pattern seeking
- Identifying and classifying.

Children are made aware of the type of investigation they are working on.

Disadvantaged and SEND pupils are at the heart of all planning sequences in the school. Like with every other lesson, we deploy a range of scaffolds, differentiation and support strategies in order to ensure every pupil can access the learning. This is reviewed as part of the Assess, Plan, Do, Review cycle.

KS1 and KS2

We teach the National Curriculum for Science. The long term plan identifies the Science topics to be taught each term to each year group across a 2 year cycle. The medium term plans identify the science objectives for the unit of work for that term. Science skills are taught continually and are identified in medium term plans. The medium term planning outlines weekly opportunities for science lessons throughout the year. This is sometimes blocked over a shorter number of weeks if necessary for the topic.

The planning is monitored by the Science Curriculum leader to ensure curriculum coverage and effective teaching and learning with an emphasis on practical exploration and investigation.

At Thakeham Primary School we use a variety of teaching and learning styles in science lessons. Children may be taught in whole-class or groups depending on their age and the learning activity. We believe children learn best when they:

- can ask questions and follow a line of enquiry
- have access to, and are able to handle equipment
- have access to secondary sources such as books, photographs and artwork.
- have visitors lead of areas of expertise
- undertake experiments to support lines of enquiry
- are shown, or use independently, resources from the internet and video clips
- are able to use non-fiction books for research
- are provided with opportunities to work independently or collaboratively, to ask as well as answer scientific enquiries

IMPACT

We intend for our children to think independently, to ask and answer questions about the world around them. To be life-long learners who are enthused, curious and inquisitive, confident to ask 'Big Questions' and who are well prepared for their future in the ever changing world.

Children's outcomes are assessed against the 2014 National Curriculum learning objectives and linked to age related expectations for each year group, following our school Feedback and Assessment Policy. SIMS is used to track pupil progress in Science on a regular basis and termly judgements ('emerging', 'expected' or greater depth) are made against relevant National Curriculum objectives. These are made at half-way points each term and at the end of the academic year. School Analytics is used to calculate individual, cohort and group progress across each term to help identify those who are on track and those who may need further support/enrichment. Outcomes are reported to parents as outlined in our Assessment and Feedback Policy. We use a range of strategies to assess progress and attainment including:

- Talking to the pupils and asking questions.
- Discussing the work with the pupil
- Looking at the work and marking against the learning objective.
- Observing the pupils carrying out practical tasks.
- Pupils' self-evaluation of their own work.
- Summative assessments for example at the end of topics

Statutory Assessment

- EYFS: Children are assessed in the early learning goal Understanding of the World. Children's outcomes are recorded as 'Emerging' (1) or (Expected' (2). Whether a child has achieved a 'Good Level of Development' is also measured and reported.
- In year 2, teachers must assess children's knowledge, skills and understanding in Science according to the National Curriculum.
- Teachers must assess pupils in Science according to the National Curriculum.
- In accordance with statutory requirements an annual report is sent to parents towards the end of the summer term. This report covers progress and achievements in Science.

National Curriculum Requirements

Early Years Statutory Framework: Science

Understanding the World

The Natural World

ELG Children at the expected level of development will:

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

Key Stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at 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

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

Lower key stage 2 – years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Lower key stage 2 programme of study

Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

Upper key stage 2 – years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Upper key stage 2 programme of study

Working scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

Year 3 programme of study

Plants

Pupils should be taught to:

identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers

explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant

investigate the way in which water is transported within plants

explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Animals, including humans

Pupils should be taught to:

identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat

identify that humans and some other animals have skeletons and muscles for support, protection and movement

Rocks

Pupils should be taught to:

compare and group together different kinds of rocks on the basis of their appearance and simple physical properties

describe in simple terms how fossils are formed when things that have lived are trapped within rock

recognise that soils are made from rocks and organic matter

Light

Pupils should be taught to:

recognise that they need light in order to see things and that dark is the absence of light

notice that light is reflected from surfaces

recognise that light from the sun can be dangerous and that there are ways to protect their eyes

recognise that shadows are formed when the light from a light source is blocked by an opaque object

find patterns in the way that the size of shadows change

Forces and magnets

compare how things move on different surfaces

notice that some forces need contact between 2 objects, but magnetic forces can act at a distance

observe how magnets attract or repel each other and attract some materials and not others

compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials

describe magnets as having 2 poles

predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Year 4 programme of study

Living things and their habitats

Pupils should be taught to:

recognise that living things can be grouped in a variety of ways

explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

recognise that environments can change and that this can sometimes pose dangers to living things

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments

Year 5 programme of study

Living things and their habitats

Pupils should be taught to:

describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

describe the life process of reproduction in some plants and animals

Animals, including humans

Pupils should be taught to:

describe the changes as humans develop to old age

Properties and changes of materials

Pupils should be taught to:

compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets

know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating

give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

demonstrate that dissolving, mixing and changes of state are reversible changes

explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

Earth and space

Pupils should be taught to:

describe the movement of the Earth and other planets relative to the sun in the solar system

describe the movement of the moon relative to the Earth

describe the sun, Earth and moon as approximately spherical bodies

use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Forces

Pupils should be taught to:

explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

identify the effects of air resistance, water resistance and friction, that act between moving surfaces

recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

Year 6 programme of study

Living things and their habitats

Pupils should be taught to:

describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals

give reasons for classifying plants and animals based on specific characteristics

Animals, including humans Pupils should be taught to: describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey **States of matter** Pupils should be taught to: compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature **Sound** Pupils should be taught to: identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases **Electricity** Pupils should be taught to: identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors	**Animals including humans** Pupils should be taught to: identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported within animals, including humans **Evolution and inheritance** Pupils should be taught 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 recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution **Light** Pupils should be taught to: recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them **Electricity** Pupils should be taught to: associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram
Support Our science curriculum seeks to include all children, through the use of high-quality discussion and investigation, to explore different science topics. Through the use of different scaffolds, such as word banks, visual aids, stem sentences, practical resources, and adult intervention, we ensure that all children are able to fully engage in science lessons. Teachers help to model working scientifically to ensure all children are able to access all elements of investigating and discovering. Meaningful and purposeful links to modern scientific discoveries and work, gives the children greater context and the ability to see opportunities open to them. Carefully chosen, high quality resources enable the children to explore science, including the celebrated work of women and wider ethnic groups in the understanding of the world we live in and the future of scientific discovery. Our working scientifically curriculum is cyclical so that children build upon disciplinary and substantive concepts during their time in primary school, supporting the cognitive process of building knowledge so that it sticks.	**Challenge** Each unit of science allows all children to ask questions and investigate along a line of enquiry. Challenge can be provided by the use of the extension question. A question which calls on the child to dive more deeply into a subject and synthesise their learning to come up with an answer: to analyse the results of their investigation and decide upon which, of a series of results, is the most significant and to record a more deeply considered conclusion. As children progress through the school, the level of challenge becomes greater and in upper Key Stage two the children are regularly called upon to answer questions which lead them to a deeper level of scientific discovery and understanding. Tasks like these challenge all children, but particularly allow children, who are exceeding the work of their peers, to shine by providing them with opportunities for independent reflection and research and to reach independent conclusions.

Cycle A

		EYFS		Year 1 and 2	Year 3 and 4	Year 5 and 6
	Autumn	Marvellous Me Different materials to build with – Magnets wood plastic etc Looking at our own environment, school grounds, what's the same/different? Harvest – how food is grown Changing materials- cooking Changing seasons animal behaviours	Let's Celebrate Changing seasons Materials/ sorting and properties Light and dark Hibernation Magnets Ice melting and freezing	Dragons and Dinosaurs Everyday materials (NC Y1)	Who Am I? Animals including humans (NC Y4)	Darwin's Delights Evolution and Inheritance (NC Y6)
	Spring	Our Wonderful World Sinking and floating different rubbish/ recycling materials Sorting materials, (rubbish and recycling) Magnets- what materials are magnetic Ice melting link to polar ice caps Looking at plants and why we need them Looking at different climates Thinking about animal adaptations	Let's Get Moving Sinking and floating Ramps and cars Making different paper aeroplanes and testing which ones fly the furthest What are stars	Frozen Planet Seasonal Changes (NC Y1)	Swords and Sandals Magnets and forces (NC Y3)	King for a Day Properties and changes of materials (NC Y5)
	Summer	Let's Get Growing Life cycles of chicks, caterpillars, frogs, humans / chicks live How do plants grow / change Life cycles Planting seeds Dissecting plants	Mighty Minibeasts Minibeasts Investigating different habitats Comparing different environments where caterpillars/ butterflies live	Where the Wild Things Are Plants (NC Y1)	Temples, tombs and treasures Animals including Humans (NC Y3)	Evacuated to Thakeham Light (NC Y6) Electricity (NC Y6)

Cycle B

	Autumn	Marvellous Me Different materials to build with – Magnets wood plastic etc Looking at our own environment, school grounds, what's the same/different? Harvest – how food is grown Changing materials- cooking Changing seasons animal behaviours	Let's Celebrate Changing seasons Materials/ sorting and properties Light and dark Hibernation Magnets Ice melting and freezing	Uses of everyday materials (NC Y2)	Reaching for New Heights Rocks and Soils (NC Y3)	Reach for the Stars Earth and Space (NC Y5)
	Spring	Our Wonderful World Sinking and floating different rubbish/ recycling materials Sorting materials, (rubbish and recycling) Magnets- what materials are magnetic Ice melting link to polar ice caps Looking at plants and why we need them Looking at different climates Thinking about animal adaptations	Let's Get Moving Sinking and floating Ramps and cars Making different paper aeroplanes and testing which ones fly the furthest What are stars	Animals including humans (NC Y1)	Dazzle and Decibels Light (NC Y3) Electricity (NC Y4) Sound (NC Y4)	Daring Explorers Living Habitats (NC Y6) Living things and their habitats (NC Y5)
	Summer	Let's Get Growing Life cycles of chicks, caterpillars, frogs, humans / chicks live How do plants grow / change Life cycles Planting seeds Dissecting plants	Mighty Minibeasts Minibeasts Investigating different habitats Comparing different environments where caterpillars/ butterflies live	Living things and their habitats (NC Y2) Plants (NC Y2)	Victorians Plants (NC Y3) States of Matter (NC Y4)	Extreme Earth Forces (NC Y5) Human Changes (NC Y5) Animals including Humans (NC Y6)

Knowledge Development and Working Scientifically Development

EYFS: Working Scientifically - PLAN DO REVIEW

- Looking closely at similarities, differences, patterns and change (40-60).
- Make observations and explain observations (ELG)

PLAN		DO			REVIEW	
To ask scientific questions	**To plan an enquiry**	**To observe closely**	**To take measurements**	**To gather / record results**	**To present results**	**To interpret results**
• Ask questions to find out more • Talk about what they see using a wide vocabulary	• Ask why questions • Choose the right resources to carry out their own plan	• Use new vocabulary • Talk about what they see using a wide vocabulary	• Develop their small motor skills so that they can use a range of tools competently, safely and confidently	• Make comparisons between objects relating to size, length, weight and capacity	• Build up to writing short sentences with words with known sound letter correspondence • Begin to describe a sequence of events real or fictional using words such as first • Draw information from a single enquiry	• Articulate their ideas and thoughts in well-formed sentences

Key Stage 1 Cycle A

Autumn Term: Everyday materials (NC Y1)

- 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

	PLAN	DO		REVIEW		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Show curiosity by asking simple questions simulated by their exploration of their world.	Begin to use simple scientific vocabulary to describe their ideas and observations.		With help decide how to sort and group materials, objects and living things or events they observe. Recognise basic features of objects, living things or events.	Respond to suggestions to identify some evidence (in the form of information, observations or measurements) that have been used to answer a question.	Present evidence they have collected in simple templates provided for them. Communicate simple features or components of objects, living things or events they have observed in appropriate forms.
Year 2: Working Scientifically	Make some suggestions about how to find things out or how to collect data to answer a question or idea they are investigating.			Sort and group objects, living things or events on the basis of what they have observed.		Present their ideas and evidence in appropriate ways using given templates.

Spring Term: Seasonal Changes (NC Y1)

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

	PLAN	DO		REVIEW		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Show curiosity by asking simple questions simulated by their exploration of their world. Draw on their everyday experience to help answer questions.	Use their senses and simple equipment to make observations. Observe changes over a period of time.		Use every day terms to describe simple features or actions of objects, living things or events they observe.	Say what has changed when observing living things, objects or events	

Year 2: Working Scientifically	Show curiosity by asking questions stimulated by their exploration of their world. Recognise that questions can be answered in different ways. Make simple predictions.	Say what happened in their experiment or investigation. Correctly use equipment provided to make observations and measurements.				
Summer Term: Plants (NC Y1 & 2) • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees. • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.						
	PLAN	**DO**		**REVIEW**		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Respond to prompts by using simple texts and electronic media to find information.		Use simple equipment safely. Share their ideas and listen to the ideas of others. Perform simple tests with support.			
Year 2: Working Scientifically	Respond to prompts by using simple texts and electronic media to find information.	Use simple scientific vocabulary to describe their ideas and observations. Make measurements, using standard or non-standard units as appropriate.	Perform simple test. Work together on an experiment or investigation and recognise contributions made by others.		Identify things to measure or observe that are relevant to the question or idea they are investigating. Respond to suggestions to identify some evidence (in the form of information, observations or measurements) needed to answer a question.	

Key Stage 1 Cycle B

Autumn Term: Uses of everyday materials (NC Y2)

- 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

	PLAN	**DO**		**REVIEW**		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Show curiosity by asking simple questions simulated by their exploration of their world. Draw on their everyday experience to help answer questions.	Use their senses and simple equipment to make observations. Begin to use simple scientific vocabulary to describe their ideas and observations.	Use simple equipment safely. Perform simple tests with support.		Say what has changed when observing living things, objects or events.	Present evidence they have collected in simple templates provided for them.
Year 2: Working Scientifically	Show curiosity by asking questions stimulated by their exploration of their world. Make some suggestions about how to find things out or how to collect data to answer a question or idea they are investigating. Make simple predictions.	Use simple scientific vocabulary to describe their ideas and observations. Correctly use equipment provided to make observations and measurements. When appropriate measure using standard units where all the numbers are on a marked scale.	Perform simple tests with support.		Respond to suggestions to identify some evidence (in the form of information, observations or measurements) that have been used to answer a question.	Present evidence they have collected in simple templates provided for them.
Spring Term: Animals including humans (NC Y1 and Y2) • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense						

- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

	PLAN	DO		REVIEW		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Show curiosity by asking simple questions simulated by their exploration of their world.	Observe changes over a period of time.	Share their ideas and listen to the ideas of others.	Use every day terms to describe simple features or actions of objects, living things or events they observe. Recognise basic features of objects, living things or events		Communicate simple features or components of objects, living things or events they have observed in appropriate forms.
Year 2: Working Scientifically	Show curiosity by asking questions stimulated by their exploration of their world.	Make measurements, using standard or non-standard units as appropriate.	Work together on an experiment or investigation and recognise contributions made by others.	Sort and group objects, living things or events on the basis of what they have observed.		Respond to prompts to suggest different ways they could have done things.

Summer Term: Living things and their habitats (NC Y2) Plants (NC Y2)

- 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
- 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

	PLAN	DO		REVIEW		
	Ask simple questions and understand that they can be answered in different ways	**Observe closely, using simple equipment**	**Perform simple tests**	**Identify and classify**	**Use observations to suggest answers to questions**	**Gather and record data to help in answering questions**
Year 1: Working Scientifically	Talk about what they think is going to happen. Respond to prompts by making some simple suggestions about how to find an answer or make observations.				Respond to prompts to say what happened. Respond to suggestions to identify some evidence (in the form of information, observations or measurements) that have been used to answer a question.	
Year 2: Working Scientifically	Respond to prompts by using simple texts and electronic media to find information. Recognise that questions can be answered in different ways.	Say what happened in their experiment or investigation.			Identify things to measure or observe that are relevant to the question or idea they are investigating.	Say whether what happened was what they expected, acknowledging any unexpected outcomes.

Lower Key Stage 2 Cycle A

Autumn Term: Digestive system / Teeth (NC Y4)

- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the different types of teeth in humans and their simple functions.

	PLAN		**DO**			**REVIEW**			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically	Make some suggestions about how to find things out to answer a question.				Use scientific forms of language when communicating simple scientific ideas, processes or phenomena.				
Year 4 : Working Scientifically	Ask their own questions about what they observe.				Use appropriate scientific forms of language to communicate scientific ideas, processes or phenomena.				

Spring Term: Forces and magnets (NC Y3)

- Compare how things move on different surfaces.
- Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
- Describe magnets as having 2 poles.
- Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.

	PLAN		**DO**			**REVIEW**			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically	Make sensible predictions. Make suggestions about how to collect data to answer a question or idea they are investigating.	Identify one or more control variables from those provided. Select equipment or information sources from those provided to address a question	Make some accurate observations or whole number measurements relevant to questions under observation.	Present simple scientific data in more than one way, including tables and bar charts (sometimes using given templates).		Describe what they have found out in experiments or investigations.	Begin to draw straightforward conclusions from data. Suggest improvements to their investigations.	Identify straightforward patterns in observations or data presented in various formats, including tables, pie and bar charts.	

		or idea under investigation.					Answer 'What would happen if…?' 'What would happen next…?'		
Year 4 : Working Scientifically	Make reasonable predictions based on previous experiences. Respond to ideas given to them to answer questions or suggest solutions to problems.	Decide when it is appropriate to carry out fair tests in investigations. Select appropriate equipment or information sources to address specific questions or ideas under investigation.	Make sets of observations or measurements, identifying the ranges and intervals used.	Decide on appropriate ways of presenting scientific data.		Describe what they have found out in experiments or investigations linking cause and effects.	Raise further questions and make predictions for new values. Draw straightforward conclusions from data presented in various formats. Suggest improvements to their investigations, giving reasons.	Identify patterns in data presented in various formats including line graphs	
Summer Term: Living things, habitats, food chains (Y4 NC) • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things.									
	PLAN		**DO**			**REVIEW**			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically	Make some suggestions about how to find things out to answer a question.				Use scientific forms of language when communicating simple scientific ideas, processes or phenomena.				Use straightforward scientific evidence to answer questions, or to support their findings.
Year 4 : Working Scientifically	Respond to ideas given to them to answer questions or suggest solutions to problems.				Use appropriate scientific forms of language to communicate scientific ideas, processes or phenomena.				Identify scientific evidence that is being used to support or refute ideas or arguments.

Lower Key Stage 2 Cycle B

Autumn Term: Rocks and Soils (NC Y3)

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter

	PLAN		DO			REVIEW			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically		Select equipment or information sources from those provided to address a question or idea under investigation.	Make some accurate observations or whole number measurements relevant to questions under observation.	Present simple scientific data in more than one way, including tables and bar charts (sometimes using given templates).					
Year 4 : Working Scientifically		Select appropriate equipment or information sources to address specific questions or ideas under investigation.	Make sets of observations or measurements, identifying the ranges and intervals used.	Decide on appropriate ways of presenting scientific data.					

Spring Term: Light (NC Y3) Electricity and Sound (NC Y4)

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors
- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases

	PLAN		DO			REVIEW			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically	Make suggestions about how to collect data to answer a	Identify one or more control variables from those provided				Describe what they have found out in	Begin to draw straightforward conclusions from data.	Identify straightforward patterns in	

	question or idea they are investigating. Make sensible predictions.					experiments or investigations.	Suggest improvements to their investigations. Answer 'What would happen if…?' 'What would happen next…?'	observations or data presented in various formats, including tables, pie and bar charts.	
Year 4 : Working Scientifically	Ask their own questions about what they observe. Make reasonable predictions based on previous experiences.	Decide when it is appropriate to carry out fair tests in investigations.				Describe what they have found out in experiments or investigations linking cause and effects.	Raise further questions, make predictions for new values. Draw straightforward conclusions from data presented in various formats. Suggest improvements to their investigations, giving reasons.	Identify patterns in data presented in various formats including line graphs.	

Summer Term: Plants (NC Y3) States of Matter (NC Y4)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

	PLAN		**DO**			**REVIEW**			
	Ask relevant questions and use different types of scientific enquiries to answer them.	**Set up simple practical enquiries, comparative and fair tests.**	**Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	**Gather, record, classify and present data in a variety of ways to help in answering questions.**	**Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.**	**Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	**Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.**	**Identify differences, similarities or changes related to simple scientific ideas and processes.**	**Use straightforward scientific evidence to answer questions or to support their findings.**
Year 3: Working Scientifically	Make some suggestions about how to find things out to answer a question.	Identify one or more control variables from those provided. Select equipment or information sources from those provided to address a question or idea under investigation.	Make some accurate observations or whole number measurements relevant to questions under observation.	Present simple scientific data in more than one way, including tables and bar charts (sometimes using given templates).	Use scientific forms of language when communicating simple scientific ideas, processes or phenomena.	Describe what they have found out in experiments or investigations.	Begin to draw straightforward conclusions from data. Suggest improvements to their investigations. Answer 'What would happen if…?' 'What would happen next…?'		
Year 4 : Working Scientifically	Respond to ideas given to them to answer questions or suggest solutions to problems.	Decide when it is appropriate to carry out fair tests in investigations.	Make sets of observations or measurements, identifying the ranges and intervals used.	Decide on appropriate ways of presenting scientific data.	Use appropriate scientific forms of language to communicate scientific ideas,	Describe what they have found out in experiments or investigations linking cause and effects.	Raise further questions, make predictions for new values.		

		Select appropriate equipment or information sources to address specific questions or ideas under investigation.			processes or phenomena.		Draw straightforward conclusions from data presented in various formats. Suggest improvements to their investigations, giving reasons.		

Upper Key Stage 2 Cycle A

Autumn Term: Evolution and Inheritance (Y6 NC)

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years a
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaption may lead to evolution.

	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**
Year 5: Working Scientifically	Select appropriate information sources to address specific questions or ideas under investigation.				Identify scientific evidence they have used in drawing their conclusion.	Use scientific ideas when describing simple processes or phenomena. Use simple models to describe scientific ideas. Use scientific and mathematical conventions when communicating information or ideas. Identify scientific evidence that have been used to support or refute ideas or arguments. Describe some simple positive and negative consequences of scientific and technological developments.
Year 6 : Working Scientifically			Use appropriate scientific and mathematical conventions and terminology to communicate abstract ideas.			Explain processes or phenomena, suggest solutions to problems or answer questions by drawing on abstract ideas or models. Identify the use of evidence and creative thinking by scientist in the development of scientific ideas. Describe different viewpoints a range of people may have about scientific or technological developments.

Spring Term: Properties and changes of materials (Y5 NC)

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes.
- Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**
Year 5: Working Scientifically	Plan different types of scientific enquiries to answer questions. Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Select appropriate equipment to address specific questions or ideas under investigation. Identify possible risks to themselves and other.	Make sets of observations or measurements where appropriate, identifying the ranges and intervals used.	Select appropriate ways of presenting scientific data.	Use previous test results to make predictions.	Identify patterns in data presented in various formats, including line graphs. Suggest improvements to their working methods, giving reasons.	
Year 6 : Working Scientifically	Recognise significant variables in investigations, selecting the most suitable to investigate. Explain what particular pieces of equipment or information are appropriate for the questions or ideas under investigation. Make, and act on, suggestions to control obvious risks to themselves and others. Plan different types of scientific enquires to find answers to their own questions.	Repeat sets of observations or measurements where appropriate, selecting suitable ranges or intervals.	Decide on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables	Use their test results to identify when further tests and observations might be needed.	Draw valid conclusions that utilise more than one piece of supporting evidence, including numerical data and line graphs. Evaluate the effectiveness of their working methods, making practical suggestions for improving them. Suggest how collaborative approaches to specific experiments or investigations may improve the evidence collected.	

Summer Term: Light (Y6 NC) Electricity (NC Y6)

- Recognise that light appears to travel in straight lines.
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram

	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**

					forms such as displays and other presentations.	
Year 5: Working Scientifically	Plan different types of scientific enquiries to answer questions. Select appropriate equipment to address specific questions or ideas under investigation. Identify possible risks to themselves and other.				Suggest improvements to their working methods, giving reasons.	Use simple models to describe scientific ideas.
Year 6 : Working Scientifically	Plan different types of scientific enquires to find answers to their own questions.				Evaluate the effectiveness of their working methods, making practical suggestions for improving them. Suggest how collaborative approaches to specific experiments or investigations may improve the evidence collected.	Identify the use of evidence and creative thinking by scientist in the development of scientific ideas.

Upper Key Stage 2 Cycle B

Autumn Term: Earth and Space (NC Y5)

- describe the movement of the Earth and other planets relative to the sun in the solar system
- describe the movement of the moon relative to the Earth
- describe the sun, Earth and moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**
Year 5: Working Scientifically						Use scientific ideas when describing simple processes or phenomena. Use simple models to describe scientific ideas. Identify scientific evidence that is being used to support or refute ideas arguments. Describe some simple positive and negative consequences of scientific and technological developments.
Year 6 : Working Scientifically						Explain processes or phenomena, suggest solutions to problems or answer questions by drawing on abstract ideas or models. Identify the use of evidence and creative thinking by scientist in the development of scientific ideas. Describe different viewpoints a range of people may have about

						scientific or technological developments.
Spring Term: Living things and their habitats (NC Y5) Living Habitats (NC Y6) • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics						
	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**
Year 5: Working Scientifically			Select appropriate ways of presenting scientific data. Use scientific and mathematical conventions when communicating information or ideas.		Draw straightforward conclusions from data presented in various formats,	Use simple models to describe scientific ideas.
Year 6 : Working Scientifically			Use appropriate scientific and mathematical conventions and terminology to communicate abstract ideas.			Explain processes or phenomena, suggest solutions to problems or answer questions by drawing on abstract ideas or models. Identify the use of evidence and creative thinking by scientist in the development of scientific ideas. Describe different viewpoints a range of people may have about scientific or technological developments.
Summer Term: Forces (NC Y5) Human Changes (NC Y5) Animals including Humans (NC Y6) • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect • describe the changes as humans develop to old age • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • describe the ways in which nutrients and water are transported within animals, including humans						
	PLAN	**DO**		**REVIEW**		
	Plan different types of scientific enquires to answer questions, including recognising and controlling variables when necessary.	**Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**	**Use test results to make predictions to set up further comparative and fair tests.**	**Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**	**Identify scientific evidence that has been used to support or refute ideas or arguments.**
Year 5: Working Scientifically	Plan different types of scientific enquiries to answer questions. Recognise when and how to set up comparative and fair tests and	Make sets of observations or measurements where appropriate, identifying the ranges and intervals used.		Use previous test results to make predictions	Suggest improvements to their working methods, giving reasons.	

	explain which variables need to be controlled and why. Select appropriate equipment or information sources to address specific questions or ideas under investigation. Identify possible risks to themselves and other.				Draw straightforward conclusions from data presented in various formats, Identify scientific evidence they have used in drawing their conclusion.	
Year 6 : Working Scientifically	Recognise significant variables in investigations, selecting the most suitable to investigate. Explain what particular pieces of equipment or information are appropriate for the questions or ideas under investigation. Make, and act on, suggestions to control obvious risks to themselves and others. Plan different types of scientific enquires to find answers to their own questions.	Repeat sets of observations or measurements where appropriate, selecting suitable ranges or intervals.	Decide on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables.		Interpret data in a variety of forms, recognising obvious inconsistencies. Provide straightforward explanations for differences in repeated observations or measurements. Evaluate the effectiveness of their working methods, making practical suggestions for improving them. Suggest how collaborative approaches to specific experiments or investigations may improve the evidence collected.	