Science

Vision – 'all things are possible'

At Benedict Biscop we want our children to learn that all things are possible. We want our children to aspire and to achieve highly. We want all children to have a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future – BECOMING SCIENTISTS.

Characteristics of Scientist:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts.
- A passion for science and its application in past, present and future technologies.

At Benedict Biscop, scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Topics, such as Plants, are taught in each phase [from Early Years to Key Stage Two in greater detail]. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory. All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

EYFS Statutory Framework – Knowledge and understanding of the world

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries, and museums to meeting important members of society such as police officers, nurses, and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes, and poems will foster their understanding of our culturally, socially, technologically, and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

Early Learning Goals:

Knowledge and understanding of the world
Children at the expected level of development will: The Natural World: -Explore the natural world around them, making observations and drawing pictures of animals and plants. -Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Development Matters progression related to Science:

Birth to Three	Three to Four	Reception
Knowledge and Understanding of the World -Repeat actions that have an effect. -Explore materials with different properties. -Explore natural materials, indoors and outside. -Explore and respond to natural phenomena in their setting and on trips.	**Knowledge and Understanding of the World** -Use all their senses in hands-on exploration of natural materials. -Explore collections of materials with similar and/or different properties. -Talk about what they see, using a wide vocabulary. -Explore how things work -Plant seeds and care for growing plants. -Understand the key features of the life cycle of a plant and an animal. -Begin to understand the need to respect and care for the natural environment and all living things. -Explore and talk about different forces they can feel. -Talk about the differences between materials and changes they notice.	**Knowledge and Understanding of the World** -Repeat actions that have an effect. -Explore materials with different properties. -Explore natural materials, indoors and outside. -Explore and respond to natural phenomena in their setting and on trips

NURSERY

Autumn Term	Spring Term	Summer Term
-Begin to talk about myself -Name different stages in development e.g. baby, toddler -Name facial body parts -Describe simple needs e.g. warmth food, sleep, water -Describe changes in weather and plants -Name some seasons and seasonal fruits	-Talk about Winter in greater detail i.e. the changes with the environment and plants -Talk about Spring in greater detail i.e. the changes with the environment and plants -Know appropriate clothing for better insulating in winter -Name plants that we eat -Begin to know how we care for plants	-Know animals that live inside and outside -Know animals grow from babies/eggs -Name basic features of animals -Identify invertebrates in immediate environment -Learn how we might show care for animals -learn about changes in a lifecycle e.g. butterfly, frog

RECEPTION

Autumn Term	Spring Term	Summer Term
-Begin to gain an awareness in the stages of a human lifecycle e.g. baby comes before toddler -To know what their sense are -To use their senses and describe what they can sense -To describe differences and similarities -To describe changes in weather -To notice change over time e.g. change in leaf colour, decay of vegetables -To learn that some animals hibernate	-To describe changes to the environment linked to seasons and time -To name a range of materials in the environment and think about how they could be used based on their properties -Name simple parts of a plant -Name common plants found in our outdoor area	-lean about how invertebrates adapt to survive -Identify plants they eat -Think about consumers and basic animal food chains -Think about conditions for successful plant growth -Name animals in different parts of the world -Learn about how they are adapted for survival

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 an implication of science, today and for the future.

Key Stage 1 Science
Pupils should be encouraged to:

- experience and observe phenomena
- look more closely at the natural and humanly-constructed world around them
- be curious and ask questions about what they notice

- 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.
- 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.
- 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 must always be taught through and clearly related to the teaching of substantive science content in the programme of study.

Lower Key Stage 2 Science
Pupils should be encouraged to:

- explore, talk about, test and develop ideas about everyday phenomena and the relationships between living things and familiar environments
- develop their ideas about functions, relationships and interactions
- 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.
- draw conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Upper Key Stage 2 Science
Pupils should be encouraged to:

- explore and talk about their ideas; ask their own questions about scientific phenomena; and analyse functions, relationships and interactions more systematically
- encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates
- recognise that scientific ideas change and develop over time
- 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
- 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

Progression

To meet our curriculum aims, we have identified core strands of learning [generic learning objectives] which run throughout our curriculum. We have identified what this should look like at the end of key phases within the school [key skills demonstrated linked to working scientifically].
The curriculum is taught in a spiral design where learning is revisited and embedded – deepening learning and developing Mastery.

'Working scientifically' must 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);
  researching using secondary sources.

Working Scientifically

Key generic learning objectives	EYFS	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
To generate ideas and ask questions Observe and explore to generate ideas, define problems and pose questions in order to develop investigations and products.	• Talk about what they see, using a wide vocabulary. • Explore how things work. • Describe what they seem hear and feel	· ask simple questions and recognise that they can be answered in different ways	· ask their own questions about what their observations, **developing why.**	· ask relevant questions and use different types of scientific enquiries to answer them	· ask relevant questions and use different types of scientific enquiries to answer them**, including variables**	· plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
To investigate, observe and record Engage safely in practical investigations and experiments and gather and record evidence by observation and measurement.	• Use all their senses in hands-on exploration of materials. • Explore how things work and the world around them. • Describe what they see, hear and feel.	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** · use simple secondary sources to find answers **and develop further questions.**	· 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 · record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables · gather, record, classify and present data in a variety of ways to help in answering questions	· set up simple practical enquiries, comparative and fair tests, **independently.** · make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** · record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables · gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**	· 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	· take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** · record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**
To conclude ideas and concepts Communicate and model in order to explain and develop ideas, share findings and conclusions.	• Talk about what they see, using a wide vocabulary.	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**	· identify differences, similarities or changes related to simple scientific ideas and processes · report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions · use straightforward scientific evidence to answer questions or to support their findings	· identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** · report on findings from enquiries, **developing relationships.**	· identify scientific evidence that has been used to support or refute ideas or arguments · 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	· identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** · report and present **explanations** 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 evaluate To continually make systematic evaluations when designing and making, to bring about improvements in processes and outcomes.				· use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	· use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions	· use test results to make predictions to set up further comparative and fair tests · describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	· use test results to **identify further questions arising from their results** · describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

Plants

*Note red objectives are for reference only (showing links)

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them • Explore the natural world around them, making observations and drawing pictures of animals and plants.. • Understand some important processes and changes in the natural world. .	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • become familiar with plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). • identify and describe the basic structure of a variety of common flowering plants, including trees. • observe the growth of flowers and vegetables that they have planted. • use the local environment throughout the year to explore and answer questions about plants growing in their habitat.	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • become familiar with plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). • identify and describe the basic structure of a variety of common flowering plants, including trees. • observe the growth of flowers and vegetables that they have planted. • use the local environment throughout the year to explore and answer questions about plants growing in their habitat. • Identify and name a variety of plants and animals in their habitats, including microhabitats (Y2 Living things and their habitats)	• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • introduced to the relationship between structure and function: the idea that every part has a job to do. • explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. • 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.	• Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 – Living things and their habitats) • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)	• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats) • Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

Living Things

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them • Explore the natural world around them, making observations and drawing pictures of animals and plants.. • Understand some important processes and changes in the natural world.	• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) • Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) • Observe changes across the four seasons. (Y1 - Seasonal change)	• Explore and compare the differences between things that are living, dead, and things that have never been alive. • 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. • Understand that all living things have certain characteristics that are essential for keeping them alive and healthy • raise and answer questions that help them to become familiar with the life processes that are common to all living things • Notice that animals, including humans, have offspring which grown into adults (Y2 Animals including humans)	• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)	• 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. • use the local environment to raise and answer questions that help them to identify and study plants and animals in their habitat. • identify how the habitat changes throughout the year. • explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. • put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects • explore examples of human impact	• 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. • observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment • find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics. • introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. • Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). • discuss reasons why living things are placed in one group and not another. • find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

					(both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. • Construct a variety of food chains, identifying producers, predators and prey (Y4 Animals, including humans)		

Animals Including Humans

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Understand some important processes and changes in the natural world.	• 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 • To learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.	• notice that animals, including humans, have offspring which grow into adults • introduced to the processes of reproduction and growth in animals. *The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult*. • find out about and describe the basic needs of animals, including humans, for survival (water, shelter, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement. • Know the importance of nutrition and explore the main body parts associated with the skeleton and muscles • find out how different parts of the body have special functions.	• 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. • introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine • explore questions that help main body parts to understand their special functions.	• describe the changes as humans develop to old age. • draw a timeline to indicate stages in the growth and development of humans. • learn about the changes experienced in puberty. • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (Y5 Living things and their habitats) • Describe the life processes of reproduction in some plants and animals (Y5 Living things and their habitats)	• identify and name the main parts of the human circulatory system, • 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. • explore and answer questions that help them to understand how the circulatory system enables the body to function. • learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. • 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 (Y6 Living things and their habitats) • Give reasons for classifying planst and animals based on specific characteristics (Y6 Living things and their habitats)

BENEDICT
BISCOP

C.E. ACADEMY

Habitats

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Understand some important processes and changes in the natural world. • Know some similarities and differences between the natural world around them and contrasting environments.	• understand how to take care of animals taken from their local environment and the need to return them safely after study. • use the local environment throughout the year to explore and answer questions about animals in their habitat.	• Understand and use the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter) in context • identify and name a variety of plants and animals in their habitats, including microhabitats • raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals • compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. • 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.	**SEE LIVING THINGS ABOVE FOR KS2 HABITAT LINKS.**			

Evolution and Inheritance

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Talk about members of their immediate family and community • . • Name and describe people who are familiar to them. • • Comment on images of familiar situations in the past. • • Talk about the lives of the people around them and their roles in society. •Understand the past through settings, characters and events encountered in books read in class and storytelling.		• 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. (Y2 - Living things and their habitats)	• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)	• Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)		• 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. • introduced to the idea that characteristics are passed from parents to their offspring • appreciate that variation in offspring over time can make animals more or less able to survive in particular environments •

Seasonal Change

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them • 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. • Understand some important processes and changes in the natural world.	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies • observe and talk about changes in the weather and the seasons.		• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)		• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space)	

Materials

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Talk about the differences between materials and changes they notice • Understand some important processes and changes in the natural world.	• 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. • explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent • explore and experiment with a wide variety of materials for example: brick, paper, fabrics, elastic, foil.	• 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. • identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing or different materials are used for the same thing • consider the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials.)	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)	• 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. • explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). • observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.	• 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. • build a more systematic understanding of materials by exploring and	

						comparing the properties of a broad range of material	

BENEDICT BISCOP
C.E. ACADEMY

Rocks

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Explore how things work. • Begin to understand the need to respect and care for the natural environment . • Talk about the differences between materials and changes they notice. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Explore the natural world around them, making observations and drawing pictures. • Understand some important processes and changes in the natural world.	• Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)	• 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. • explore different kinds of rocks and soils, including those in the local environment.			• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance)

Light

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Use all their senses in hands-on exploration of natural materials. • Talk about what they see, using a wide vocabulary. • Explore how things work. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them • Know some similarities and differences between the natural world around them and contrasting environments.	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)		• 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. • explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. • why it is important to protect their eyes from bright lights. • look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.			• 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. • exploring the way that light behaves, including light sources, reflection and shadows. Pupils should talk about what happens and make predictions.

BENEDICT
BISCOP

C.E. ACADEMY

Forces

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Explore how things work. • Explore and talk about different forces they can feel.		• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)	• compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing. • observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary • explore the behaviour and everyday uses of different magnets		• 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. • explore falling objects and raise questions about the effects of air resistance. • explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. • experience forces that make things begin to move, get faster or slow down • explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. • explore the effects of levers, pulleys and simple machines on movement • find out how scientists, for example, Galileo Galilei and Isaac	

						Newton helped to develop the theory of gravitation.	

Sound

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Use all their senses in hands-on exploration of natural materials. • Talk about what they see, using a wide vocabulary. • Explore and talk about different forces they can feel. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)			• 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.		

					• explore and identify the way sound is made through vibration in a range of different musical instruments • find out how the pitch and volume of sounds can be changed in a variety of ways		

BENEDICT
BISCOP

C.E. ACADEMY

Electricity

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • • Talk about what they see, using a wide vocabulary. • Explore how things work.				• 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. • construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches • use their circuits to create simple devices • draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. • understand the precautions for working safely with electricity.		• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram. • construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. •

Earth and Space

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Explore and talk about different forces they can feel. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them • Explore the natural world around them, making observations and drawing pictures • Know some similarities and differences between the natural world around them and contrasting environments. • Understand some important processes and changes in the natural world	• Observe changes across the four seasons. (Y1 - Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)				• 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. • introduced to a model of the Sun and Earth that enables them to explain day and night. • learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). • understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). Understand how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy,	

						Alhazen and Copernicus.	

BENEDICT BISCOP
C.E. ACADEMY

Scientist and Inventors- This unit is used to deepen understanding, developing greater depth.

The expectation in this unit is that staff will choose at least two scientists/inventors to look at in detail, based on the pupils' interests.

	EYFS	KS1		LKS2		UKS2	
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Unit Specific Learning Objectives	• Talk about what they see, using a wide vocabulary. • Talk about the lives of the people around them and their roles in society. • Understand the past through settings, characters and events encountered in books read in class and storytelling. • Explore how things work. • Begin to understand the need to respect and care for the natural environment and all living things. • • Talk about the differences between materials and changes they notice. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand some important processes and changes in the natural world	**LEGO** • To describe the simple physical properties of a variety of everyday materials, by identifying the properties of plastic in the context of Lego. • To use observations to suggest answers to questions, by thinking about why Lego is made out of plastic. **MAE JEMISON** • To ask simple questions and use simple secondary sources to find answers, by role playing an interview with Mae Jemison **ZOOS- including local farms/ aquariums** • To describe and compare the structure of a variety of common animals, by sorting animals according to their features • To identify and classify animals, by sorting animals according to their features **SENSORY GARDEN** • To identify and name a variety of common wild and garden plants, by exploring a range of sensory plants. • To gather and record data to help in answering questions, by creating a chart showing the class' most popular sensory plants. **MEASURING THE WEATHER- use in school weather station/ BBC Newcastle to see where it is filmed.** • To observe and describe weather associated with the seasons, by	**Plants** **Greenhouse Growing – Eden Project- Doxford community gardens** • To find out how plants need water, light and a suitable temperature to grow and stay healthy in the context of exploring how plants grow in greenhouses, including in the biomes at the Eden Project. • To find out how plants need water, light and a suitable temperature to grow and stay healthy in the context of comparing plant growth in and out of a greenhouse **Brilliant Botany – Jane Colden- Winter Gardens Preston Park** • To identify and describe the basic structure of common flowering plants by observing and sketching a range of common plants. • To observe closely using simple equipment by using a magnifying glass to sketch details of different plants. **Animals Including Humans** **Elizabeth Garrett Anderson- doctors surgery** • To use their observations and ideas to suggest answers to questions in the context of considering whether doctors are scientists. • To describe the importance for humans of exercise, of eating the right amounts of different types of food, and hygiene in the context of creating a poster for a doctor's	**Plants** **Joseph Banks** □ To identify differences, similarities or changes related to simple scientific ideas and processes by finding out about the men and women who introduced new plants to our gardens. □ To 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 by exploring the way that non-native plants have been discovered, transported and introduced. **George Washington Carver- Washington Old Hall** □ 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. □ To identify changes related to scientific ideas by describing the achievements of George Washington Carver. **Animals Including Humans** **Marie Curie- Hospital X-ray dept** □ To identify changes related to scientific ideas by describing Marie Curie's research into x-rays. □ To identify that humans have skeletons for support, protection and movement by identifying	**Living Things and their Habitats** **Gerald Durrell** • To recognise that environments can change and that this can sometimes pose dangers to living things by exploring Gerald Durrell's conservation work in Madagascar. • To set up simple practical enquires and report on findings from enquires in the context of soil erosion and nutrient loss. **Sound** **Alexander Graham Bell** • To recognise that vibrations from sounds travel through a medium to the ear in the context of Alexander Graham Bell's invention of the telephone. • To report on findings, including oral and written presentations and displays in the context of Alexander Graham Bell's invention of the telephone. **States of Matter** **Maria Telkes** • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers in	**Living Things and their Habitats** **David Attenborough- Current News Issues linked in** • To find out about the work of naturalists and animal behaviourists in the context of the life and work of David Attenborough. **Properties of Materials** **CSI- Police visit for investigations** • To identify scientific evidence that has been used to support or refute ideas or arguments in the context of how CSI technicians use evidence to solve crimes. • To use knowledge of solids, liquids and gases to decide how mixtures might be separated in the context of using chromatography to solve a 'crime'. **Earth and Space- Kielder observatory** **Margaret Hamilton** • To describe how scientific ideas have changed over time in the context of Margaret Hamilton's development of the software for the Apollo Moon missions. **Stonehenge** • To identify scientific evidence that has been used to support or refute ideas in the context of the theories surrounding the alignment of the	**Living things and their habitats- Libbie Hyman** • To give reasons for classifying plants and animals based on specific characteristics in the context of Libbie Hyman's work on classifying vertebrates and invertebrates. **Animals Including Humans –** **Marie Maynard Daly – NHS- school nurses** • To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function in the context of exploring Marie Maynard Daly's findings on diet and heart-health. **Alexander Fleming** • To record data using scatter graphs in the context of Fleming's discovery of penicillin. **Dr Daniel Hale Williams- Heart Start** • To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood in the context of finding out about Dr Daniel Hale Williams, then labelling the parts and functions of the circulatory system. **Mary Leakey- Evolution and Inheritance- linked into RE.** • To recognise that living things have changed over time and that fossils

		measuring rainfall with a rain gauge they have made • To gather and record data to help in answering questions, by measuring rainfall with a rain gauge they have made. **AT THE VETS- get a vet into school or visit vets** • To describe and compare the structure of a variety of common animals, including pets, by exploring the work of vets. • To identify and classify, by identifying the basic parts of animals' bodies	surgery to explain how to stay healthy. **Louis Pasteur** • To describe the importance of hygiene to humans in the context of investigating Louis Pasteur's work on how germs spread. • To use their observations and ideas to answer simple question in the context of investigating how germs spread and the effect of hand washing. **Materials- Charles Macintosh** • To find out about people who have developed new materials in the context of learning about Charles Macintosh • To identify and compare the suitability of a variety of everyday materials for particular uses in the context of testing materials to find the most suitable material for a waterproof coat. **Living Things and Their Habitats** **Rachel Carson- West Boldon Lodge** • To describe how animals obtain their food from plants and other animals, using the idea of a simple food chain in the context of exploring Rachel Carson's study of the ocean. • To observe closely, using simple equipment in the context of investigating the effects of pesticides in water, as researched by Rachel Carson. •	and explaining the bones shown in x-rays. **Rocks- Great North Museum for fossils and rocks.** **William Smith** □ 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 by exploring William Smith's principle of fossil succession. **Inge Lehmenn** □ To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties by finding out about Inge Lehmann's discovery of Earth's solid core and how this creates igneous rocks. **Light** **Arthur James Wilson** □ To notice that light is reflected from surfaces by investigating concave and convex mirrors. □ To ask relevant questions and use evidence from scientific enquiries to answer them and support findings by investigating concave and convex mirrors. □ To gather, record, classify and present data in a variety of ways to help in answering questions by investigating concave and convex mirrors.	context of building a solar oven. **Electricity** **Garrett Morgan** • Construct a simple series electrical circuit, identifying and naming the basic parts, including cells, wires, bulbs, switches and buzzers. • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit in context of creating a traffic light. **Thomas Edison- Newcastle and Cragside** • To identify changes related to scientific ideas and processes by exploring Thomas Edison's work with electricity locally and nationally. • To identify common electrical appliances that run on electricity by exploring Thomas Edison's work with electricity. **States of matter** **Joseph Priestley** • To compare and group materials together according to whether they are solids, liquids or gases by exploring the discovery of oxygen. • To identify changes relating to simple scientific ideas and processes by exploring the discovery of oxygen and the theory of phlogiston. **Kelvin- Absolute Zero- Life Centre** • To observe that some materials change state when	stones at Stonehenge. **Animals including Humans** **Eva Crane- Washington Old Hall** □ To describe the life process of reproduction in some plants and animals in the context of Eva Crane's research into the life cycle of bees.	provide information about living things that inhabited the Earth millions of years ago in the context of Mary Leakey's fossil findings in the Olduvai Gorge. **Electricity** **Steve Jobs- Apple store** • To use recognised symbols when representing a simple circuit in a diagram in the context of the invention of Apple computers and the life of Steve Jobs.

					they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) by exploring Kelvin's discovery of absolute zero. • To take accurate measurements using standard units and a range of equipment, including thermometers by comparing the Kelvin scale with Celsius.		

KNOWLEDGE AND SKILLS BY TOPIC & YEAR GROUP
*note red are end of Key Stage objectives

YEAR 1

AUTUMN	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Materials	• distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties. • explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. • explore and experiment with a wide variety of materials for example: brick, paper, fabrics, elastic, foil.	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.**
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**
Seasonal change/weather (Autumn/ Winter) Scientists and Inventors	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies • observe and talk about changes in the weather and the seasons.	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**
		To evaluate		

SPRING	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Animals including humans	• identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • To learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.**
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**

Habitats of Animals	• understand how to take care of animals taken from their local environment and the need to return them safely after study. • use the local environment throughout the year to explore and answer questions about animals in their habitat.	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**
		To evaluate		

SUMMER	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Plants	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • become familiar with plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). • identify and describe the basic structure of a variety of common flowering plants, including trees. • observe the growth of flowers and vegetables that they have planted. • use the local environment throughout the year to explore and answer questions about plants growing in their habitat.	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.**
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**
Seasonal change/weather (Spring/ Summer) Scientists and Inventors	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies • observe and talk about changes in the weather and the seasons. ***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**
		To evaluate		

YEAR 2

AUTUMN	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Plants	• 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. • use the local environment throughout the year to observe how different plants grow. • introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.**
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**
Living Things	• Explore and compare the differences between things that are living, dead, and things that have never been alive. • 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. • Understand that all living things have certain characteristics that are essential for keeping them alive and healthy • raise and answer questions that help them to become familiar with the life processes that are common to all living things	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**
		To evaluate		

SPRING	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Habitats	• Understand and use the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter) in context • identify and name a variety of plants and animals in their habitats, including microhabitats • raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals • compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. • 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.	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.** □
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**
Animals including humans	• notice that animals, including humans, have offspring which grow into adults • introduced to the processes of reproduction and growth in animals. *The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to*	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**

	understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult. • find out about and describe the basic needs of animals, including humans, for survival (water, shelter, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.			
		To evaluate		

SUMMER	**Scientific Knowledge**	**Key generic learning objectives**	**KS1 working at the EXPECTED STANDARD**	**KS1 working ABOVE the expected standard**
Materials	• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing or different materials are used for the same thing • consider the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials.	**To generate ideas and ask questions**	· ask simple questions and recognise that they can be answered in different ways	□ ask their own questions about what their observations, **developing why.**
		To investigate, observe and record	· observe closely, using simple equipment · perform simple tests · gather and record data to help in answering questions •use simple secondary sources to find answers	· observe **carefully and** closely, using simple equipment · perform simple tests **taking measurements** · gather and record data to help in answering questions **and begin to present it in an appropriate way** •use simple secondary sources to find answers **and develop further questions.**
Scientists and Inventors	***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***	**To conclude ideas and concepts**	· identify and classify · use their observations and ideas to suggest answers to questions	· identify and classify, **beginning to develop similarities and differences.** · use their observations and ideas to suggest answers to questions, **giving simple reasons why.**
		To evaluate		

YEAR 3

AUTUMN	Scientific Knowledge	Key generic learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Plants	• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • introduced to the relationship between structure and function: the idea that every part has a job to do. • explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. • 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.	**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**
		To investigate, observe and record	• 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 • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • gather, record, classify and present data in a variety of ways to help in answering questions	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** • record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables • gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**
Animals including humans	• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement. • Know the importance of nutrition and explore the main body parts associated with the skeleton and muscles • find out how different parts of the body have special functions.	**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • use straightforward scientific evidence to answer questions or to support their findings	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**
		To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

SPRING	Scientific Knowledge	Key generic learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Rocks	• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter. • explore different kinds of rocks and soils, including those in the local environment.	**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**
		To investigate, observe and record	• 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	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment,

			• record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	including thermometers and data loggers, **repeating results to discuss accuracy** • record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**
Forces and magnets	• compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing. • observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary • explore the behaviour and everyday uses of different magnets	**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**
		To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

SUMMER	**Scientific Knowledge**	**Key generic learning objectives**	**Lower KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
Light	• recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • 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. • explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. • why it is important to protect their eyes from bright lights. • look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.	**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**
		To investigate, observe and record	• 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 • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** • **r**ecord findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**
Scientists and Inventors	***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***	**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**

				scientific evidence to answer questions or to support their findings	
			To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

YEAR 4

AUTUMN	**Scientific Knowledge**	**Key generic learning objectives**	**Lower KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
Animals including humans	• 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. • introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine • explore questions that help main body parts to understand their special functions.	**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**
		To investigate, observe and record	• 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 • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** • record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**
Electricity	• identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors. • construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches • use their circuits to create simple devices • draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. • understand the precautions for working safely with electricity.	**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**
		To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

SPRING	**Scientific Knowledge**	**Key generic learning objectives**	**Lower KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
All living things	• 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	**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**

	recognise that environments can change and that this can sometimes pose dangers to living things. use the local environment to raise and answer questions that help them to identify and study plants and animals in their habitat. identify how the habitat changes throughout the year. explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.		**To investigate, observe and record**	• 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 • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** • record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**
States of matter	• compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). • observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.		**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**
			To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

SUMMER	**Scientific Knowledge**		**Key generic learning objectives**	**Lower KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
Sound	• identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases. • explore and identify the way sound is made through vibration in a range of different musical instruments • find out how the pitch and volume of sounds can be changed in a variety of ways.		**To generate ideas and ask questions**	• ask relevant questions and use different types of scientific enquiries to answer them	• ask relevant questions and use different types of scientific enquiries to answer them**, including variables**
			To investigate, observe and record	• 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 • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	• set up simple practical enquiries, comparative and fair tests, **independently.** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, **repeating results to discuss accuracy** • record findings using **more complex** scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to answer questions, **justifying their answers.**

Scientists and Inventors	***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***		**To conclude ideas and concepts**	• identify differences, similarities or changes related to simple scientific ideas and processes • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings	• identify differences, similarities or changes related to simple scientific ideas and processes, **justifying their reasoning.** • report on findings from enquiries, **developing relationships.**
			To evaluate	• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• use results to draw conclusions, make predictions for new values, suggest improvements and raise further **justified** questions

BISCOP C.E. ACADEMY

YEAR 5

AUTUMN	**Scientific Knowledge**
Living things and their habitats	• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals. • observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment • find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.
Animals including humans	• describe the changes as humans develop to old age. • draw a timeline to indicate stages in the growth and development of humans. • learn about the changes experienced in puberty.

Key generic learning objectives	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
To generate ideas and ask questions	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**
To conclude ideas and concepts	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

SPRING	**Scientific Knowledge**
Properties and changes of materials	• compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • 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,

Key generic learning objectives	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
To generate ideas and ask questions	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter

	including changes associated with burning and the action of acid on bicarbonate of soda. • build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials • explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. • explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. • observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. **Safety guidelines should be followed when burning materials.**			graphs, bar and line graphs **independently.**
Earth and Space	• describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. • introduced to a model of the Sun and Earth that enables them to explain day and night. • learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). • understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). • Understand how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.	**To conclude ideas and concepts**	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

SUMMER	**Scientific Knowledge**	**Key generic learning objectives**	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
Forces	• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. • explore falling objects and raise questions about the effects of air resistance. • explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. • experience forces that make things begin to move, get faster or slow down • explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. • explore the effects of levers, pulleys and simple machines on movement • find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	**To generate ideas and ask questions**	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
		To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**

Scientists and Inventors	***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***		**To conclude ideas and concepts**	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

YEAR 6

AUTUMN	**Scientific Knowledge**
Living things and their habitats	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics. • introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. • Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). • discuss reasons why living things are placed in one group and not another. • find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.
Animals including humans	• identify and name the main parts of the human circulatory system, • 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. • explore and answer questions that help them to understand how the circulatory system enables the body to function. • learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Key generic learning objectives	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
To generate ideas and ask questions	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**
To conclude ideas and concepts	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

SPRING	**Scientific Knowledge**
Evolution and inheritance	• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. • introduced to the idea that characteristics are passed from parents to their offspring • appreciate that variation in offspring over time can make animals more or less able to survive in particular environments

Key generic learning objectives	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
To generate ideas and ask questions	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**

Light	• recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. • exploring the way that light behaves, including light sources, reflection and shadows. Pupils should talk about what happens and make predictions.	**To conclude ideas and concepts**	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

SUMMER	**Scientific Knowledge**	**Key generic learning objectives**	**Upper KS2 working at the EXPECTED STANDARD**	**Lower KS2 working ABOVE the expected standard**
Electricity	• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram. • construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors.	**To generate ideas and ask questions**	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	**Independently** plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
		To investigate, observe and record	• 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	• take measurements, using a range of scientific equipment, with accuracy and precision, **repeatability and reproducibility** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **independently.**
Scientists and Inventors	***Choose at least two scientists/inventors to look at in detail (see Science and Inventors progression overview for possible objectives).***	**To conclude ideas and concepts**	• identify scientific evidence that has been used to support or refute ideas or arguments • 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	• identify scientific evidence that has been used to support or refute ideas or arguments, **beginning to suggest errors.** • report and present **explanations** 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 evaluate	• use test results to make predictions to set up further comparative and fair tests • describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources	• use test results to **identify further questions arising from their results** • describe and evaluate their own and other people's scientific ideas, **separating opinion from fact**

BENEDICT
BISCOP

C.E. ACADEMY