

Science

Each topic is listed, with an outline of what we would like children to *know*, *do* and *understand* within the unit.

Golden Threads:

1. Asking and Answering Questions
2. Practical Enquiries
3. Recording/Presenting Findings

Reception

EYFS Statutory Educational Programme: 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.



In Reception children will learn to:

Work Scientifically

- Explore the natural world around them (**Understanding the World**)
- Understand simple questions about 'who', 'what' and 'where' (**Communication & Language**)
- Ask questions to find out more (**Communication & Language**)
- Listen attentively and respond to what they hear with relevant questions (**ELG: Listening, Attention & Understanding**)
- Make choices and explore different resources and materials (**Playing & Exploring**)
- Be confident to try new activities and show independence, resilience and perseverance in the face of challenge (**ELG: Managing Self**)
- Know more, so feel confident about coming up with their own ideas (**Creating & Thinking Critically**)
- Respond to new experiences that you bring to their attention (**Playing & Exploring**)
- Solve real problems (**Creating and Thinking Critically**)
- Sort materials (**Creating & Thinking Critically**)
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class (**ELG: The Natural World**)
- Explore the natural world around them, making observations and drawing pictures of animals and plants (**ELG: The Natural World**)
- Realise that their actions have an effect on the world (**Playing & Exploring**)
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter (**ELG: The Natural World**)
- Develop their small motor skills so that they can use a range of tools competently, safely and confidently (**Physical Development**)
- Return to and build on their previous learning, refining ideas and developing their ability to represent them (**Expressive Art and Design**)
- Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate; (**ELG: Speaking**)
- Learn new vocabulary & use new vocabulary through the day and in different contexts (**Communication & Language**)
- Offer their own ideas, using recently introduced vocabulary (**ELG: Speaking**)

<p>Explore the natural world around them</p>	<ul style="list-style-type: none"> ● Provide children with have frequent opportunities for outdoor play and exploration. ● Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. ● Create opportunities to discuss how we care for the natural world around us. ● Offer opportunities to sing songs and join in with rhymes and poems about the natural world. ● After close observation, draw pictures of the natural world, including animals and plants. ● Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.
<p>Describe what they see, hear and feel whilst outside.</p>	<ul style="list-style-type: none"> ● Encourage focused observation of the natural world. ● Listen to children describing and commenting on things they have seen whilst outside, including plants and animals. ● Encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in. ● Name and describe some plants and animals children are likely to see, encouraging children to recognise familiar plants and animals whilst outside
<p>Understand the effect of changing seasons on the natural world around them.</p>	<ul style="list-style-type: none"> ● Guide children’s understanding by draw children’s attention to the weather and seasonal features. ● Provide opportunities for children to note and record the weather. ● Select texts to share with the children about the changing seasons. ● Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change. ● Look for children incorporating their understanding of the seasons and weather in their play.

Year 1

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none">• How to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals (such as goldfish, frogs, smooth newts, toads, robins, blackbirds, sparrows, magpies, blue tits, foxes, water voles, mice)• How to identify and name a variety of common animals that are carnivores, herbivores and omnivores (such as weasel, otter, owl / rabbit, deer, beaver / hedgehog, badger, fox)• How to describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)• How to identify, name, draw and label the basic parts of the human body and said which part of the body is associated with each sense (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth)	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none">• Use the local environment to explore and answer questions about animals and their habitat• Developed an understanding of how to take care of animals taken from their local environment and the need to return them safely after study• Been given have plenty of opportunities 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. <p>Worked scientifically by:</p> <ul style="list-style-type: none">• Using their observations to compare and contrast animals at first hand or through videos and photographs• Describing how they identify and group them• Grouping animals according to what they eat <p>.</p>	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none">• That all creatures play an important role in the ecosystem and that we should take care of them however we can• That the different parts of our body are essential for receiving different sensory information

	Know	Do	Understand
Seasons	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The signs associated Autumn and Winter, such as change in leaf colour, drop in temperature, shorter days, animals storing food e.g. squirrel • How to observe and describe weather associated with the seasons Autumn and Winter, such as measuring rainfall and the temperature • In the UK, we have longer days in the summer and shorter days in the winter. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Observed and talked about changes in the weather and the seasons. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Making tables and charts about the weather • Making displays of what happens in the world around them, including day length, as the seasons change. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How the different seasons affect trees and plants in the local area and community • That in the UK in the summer there are more hours in which the Earth is facing the sun whereas in the winter there are fewer hours having the sun and therefore shorter days

	Know	Do	Understand
Materials	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to distinguish between an object and the material from which it is made • How to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • How to describe the simple physical properties of a variety of everyday materials (such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent) • How to compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored, named, discussed, raised and answered questions about everyday materials so that they become familiar with the names of materials and properties • Explored and experimented with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a leotard?' 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That different everyday materials are used for different purposes because of their simple physical properties • How to group everyday items together based on their similarities and differences

	Know	Do	Understand
Plants	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to identify and name a variety of common wild and garden plants (for example daisy, dandelion, buttercup, ivy, hawthorn, cow parsley, sunflowers, tulips, daffodils) • How to identify and name a variety of deciduous and evergreen trees (for example oak, sweet chestnut, sycamore, silver birch / bay, fir) • How to identify and describe the basic structure of a variety of common flowering plants (including leaves, flowers, petals, roots, bulb, seed, stem). • How to identify and describe the basic structure of trees. (including leaves, blossom, petals, fruit, roots, seed, trunk, branches). 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Used the local environment throughout the year to explore and answer questions about plants growing in their habitat. • Observed the growth of flowers and vegetables that they have planted. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants • Describing how they were able to identify and group them • Drawing diagrams showing the parts of different plants including trees. • Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening • Compare and contrast what they have found out about different plants. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The importance of plants within the ecosystem to both animals and humans • The role the different parts of a plant play in helping them to grow and survive

	Know	Do	Understand
Sources of light	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • That light is created by a source • That there are natural light sources, such as the sun, lightening and the stars • That there are artificial light sources, such as lightbulbs, torches and computer screens • That it is light and dark at different times of days 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Identified different light sources around the classroom and school <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Investigating the brightness of different light sources • Complete tables and diagrams ordering light sources from the dimmest to the brightest • Grouping different light sources into natural and artificial and explaining how they know 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The importance of light for us to complete our day to day lives • The difference between light and dark

	Know	Do	Understand
Seasons	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The signs associated spring and summer, such as • How to observe and describe weather associated with the seasons spring and summer, such as measuring rainfall and the temperature • In the UK, we have longer days in the summer and shorter days in the winter. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Observed and talked about changes in the weather and the seasons. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Making tables and charts about the weather • Making displays of what happens in the world around them, including day length, as the seasons change. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How spring and summer affect trees and plants in the local area and community • That in the UK in the summer there are more hours in which the Earth is facing the sun whereas in the winter there are fewer hours having the sun and therefore shorter days

Year 2/3 (Year A)

	Know	Do	Understand
Living things and their habitats	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The differences between things that are living, dead, and things that have never been alive • 'habitat' is a natural environment or home of a variety of plants and animals and 'micro-habitat' is a very small habitat, for example for woodlice under stones, logs or leaf litter • That most living things live in habitats to which they are suited • How different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • How to identify and name a variety of plants and animals in their habitats, including microhabitats • 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. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Raised and answered questions that help them to become familiar with the life processes that are common to all living things. • Raised and answered questions about the local environment that help them to identify and study a variety of plants and animals within their habitat • Observed how living things depend on each other, for example, plants serving as a source of food and shelter for animals. • Compared animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. • Describing how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' • Talking about ways of answering their questions. • Constructing a simple food chain that includes humans (e.g. grass, cow, human). • Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and finding out how the conditions affect the number and type(s) of plants and animals that live there. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • All living things have certain characteristics that are essential for keeping them alive and healthy • All living things have an important role to play within their ecosystem and should be treated with respect

	Know	Do	Understand
Plants	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How seeds and bulbs grow into mature plants • The requirements of plants for germination, growth and survival • Seeds and bulbs need water to grow but most do not need light • Seeds and bulbs have a store of food inside them. • The processes of reproduction and growth in plants • That plants need water, light and a suitable temperature to grow and stay healthy. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Used the local environment throughout the year to observe how different plants grow. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb • Observing similar plants at different stages of growth • Setting up a comparative test to show that plants need light and water to stay healthy. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The importance of plants for everyday life • The life cycle of a plant and how it develops from a seed or a bulb to a fully mature plant • That plants need water, light and suitable temperature to grow and stay healthy

	Know	Do	Understand
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • That animals, including humans, have offspring which grow into adults • Some examples of how animals grow into adults, for example: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. • That humans go through the following stages: baby, toddler, child, teenager and adult • The basic needs of animals, including humans, for survival (water, food and air) • The importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Been introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. • Been introduced to the processes of reproduction and growth in animals. <i>NOTE - 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.</i> <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Observing, through video or first-hand observation and measurement, how different animals, including humans, grow • Asking questions about what things animals need for survival • Asking questions about what humans need to stay healthy • Suggesting ways to find answers to their questions. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That animals, including humans, have offspring that grow and develop through different stages in order to become adults • The importance of exercising and eating the right amount of different types of food

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Materials	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to identify and compare the suitability of a variety of everyday materials, for particular uses, for example building a wall, making a roof, making a boat, creating a coat • The uses of different everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard • That some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) • That different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). • The shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • That people have developed useful new materials. For example John Dunlop developed the pneumatic tyre , Charles Macintosh developed a waterproof material and John McAdam developed the macadam road surface 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Thought about and investigated the properties of materials that make them suitable or unsuitable for particular purposes • Thought about and investigated unusual and creative uses for everyday materials. • Found out about people who have developed useful new materials <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs) • Observing closely, identifying and classifying the uses of different materials • Recording their observations. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to identify and compare the suitability of a variety of everyday materials • That some materials are used for more than one thing and that different materials are used for the same thing • The importance of choosing the right materials for the function they need to serve to ensure they are fit for purpose

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Rocks	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to compare and group together different kinds of rocks on the basis of their appearance • How to compare and group together different kinds of rocks on the basis of simple physical properties • How fossils are formed when things that have lived are trapped within rock • That soils are made from rocks and organic matter. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored different kinds of rocks and soils, including those in the local environment <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Observing rocks, including those used in buildings and gravestones • Exploring how and why they might have changed over time • Using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them • Researching and discussing the different kinds of living things whose fossils are found in sedimentary rock • Exploring how fossils are formed • Exploring different soils and identifying similarities and differences between them • Investigating what happens when rocks are rubbed together or what changes occur when they are in water. • Raising and answering questions about the way soils are formed 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to compare and group together different kinds of rocks on the basis of simple physical properties and their appearance • The importance of fossils for learning about creatures from in the past and why these would be useful to historians as well as scientists

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Light	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • They need light in order to see things • Dark is the absence of light • Light is reflected from surfaces • Light from the sun can be dangerous and that there are ways to protect their eyes • Shadows are formed when the light from a light source is blocked by an opaque object • Patterns in the way that the size of shadows change. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored what happens when light reflects off a mirror or other reflective surfaces • Played mirror games to help them to answer questions about how light behaves • Thought about why it is important to protect their eyes from bright lights • Looked for and measured shadows • Found out how they are formed and what might cause the shadows to change <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Looking for patterns in what happens to shadows when the light source moves • Looking for patterns in what happens to shadows when the distance between the light source and the object changes 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • Why light is important in our everyday lives and how it has changed out daily routines • The patterns in what happens to shadows when the light source moves or the distance between the light source and object changes

Year 2/3 (Year B)

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Forces and magnets	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to compare how things move on different surfaces • That some forces need contact between two objects • Magnetic forces can act at a distance • Magnets attract or repel each other • Magnets attract some materials and not others • How to compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet • Some magnetic materials from everyday life • Magnets have two poles – north and south • How to predict whether two magnets will attract or repel each other, depending on which poles are facing. • How magnets are useful in everyday items 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Observed that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing) • Explored the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe) <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Comparing how different things move and grouping them • Raising questions and carrying out tests to find out how far things move on different surfaces • Gathering and recording data to find answers their questions • Exploring the strengths of different magnets and finding a fair way to compare them • Sorting materials into those that are magnetic and those that are not • Looking for patterns in the way that magnets behave in relation to each other • Looking for patterns in what might affect this, for example, the strength of the magnet or which pole faces another • 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That magnetic forces are different to other forces as they do not require contact – they can work from a distance • That magnets are useful in different industries due to their ability to attract and repel different objects

	Know	Do	Understand
Plants	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • The requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) • How the requirements vary from plant to plant • The way in which water is transported within plants • The part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Been introduced to the relationship between structure and function: the idea that every part has a job to do • Explored questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction • *Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser • Discovering how seeds are formed by observing the different stages of plant life cycles over a period of time • Looking for patterns in the structure of fruits that relate to how the seeds are dispersed • Observing how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers • Recording findings appropriately 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • The part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

	Know	Do	Understand
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> Animals, including humans, need the right types and amount of nutrition Animals, including humans, cannot make their own food; they get nutrition from what they eat Humans and some other animals have skeletons and muscles for support, protection and movement. The main body parts associated with the skeleton and muscles How different parts of the body have special functions 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> Continue to learn about the importance of nutrition <p>Worked scientifically by:</p> <ul style="list-style-type: none"> Identifying and grouping animals with and without skeletons Observing and comparing their movement Exploring ideas about what would happen if humans did not have skeletons 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> That each animal has different nutritional needs which they get through their diet The main body parts associated with the skeleton and muscles and their special functions within the body

	Know	Do	Understand
Earth and Space	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> The Earth rotates to give us day and night The earth rotates on an axis It takes the Earth 24 hours (1 day) to complete this rotation It takes Earth 365 days to orbit the sun (one year) The phases of the moon Our solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> Created a model of the Sun and Earth that enables them to explain day and night <p>Worked scientifically by:</p> <ul style="list-style-type: none"> Comparing the time of day at different places on the Earth through internet links and direct communication Creating simple models of the solar system 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> Why we have day and night How the Earth moves around the sun

	Know	Do	Understand
Living things and their habitats	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> What an insect is What a minibeast is Where these creatures live How they are adapted to their environment The life cycle of an inset (butterfly, bee) How insect helps us (pollinating flowers etc) 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> Observed insects and minibeasts in their local environment Created a life cycle for an inset <p>Worked scientifically by:</p> <ul style="list-style-type: none"> Asked and answered scientific questions Investigated where insects and minibeasts live Record their findings 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> Why insects and minibeast are crucial in our ecosystem

Year 4/5/6 (Year A)

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none">• How to recognise the different basic parts of the digestive system in humans. For example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine• The simple functions of the basic parts of the digestive system in humans• How to recognise the different types of teeth in humans• The simple functions of different types of teeth in humans• How to construct and interpret a variety of food chains• How to identify producers, predators and prey in food chains	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none">• Been introduced to the main body parts associated with the digestive system• Explored questions that help them to understand their special functions <p>Worked scientifically by:</p> <ul style="list-style-type: none">• Comparing the teeth of carnivores and herbivores• Suggesting reasons for differences• Finding out what damages teeth and how to look after them.• Drawing and discussing their ideas about the digestive system• Comparing them with models or images.	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none">• The simple functions of basic parts of the digestive system in humans• The different type of teeth humans have and the important of looking after them and cleaning them properly

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
States of matter	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to group materials together, according to whether they are solids, liquids or gases • Know that solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container • Some materials change state when they are heated or cooled • How to measure or research the temperature at which this happens in degrees Celsius (°C). • That water freezes to a solid at 0°C • That water boils to a gas at 100°C • The part played by evaporation and condensation in the water cycle • That the rate of evaporation is dependent on the temperature. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored a variety of everyday materials • Observed water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Grouping and classifying a variety of different materials • Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). • Researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • Observing and recording evaporation over a period of time, for example, a puddle in the playground or washing on a line • Investigating the effect of temperature on washing drying or snowmen melting. • Recording findings appropriately 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to group materials together according to whether they are solids, liquid or gases and explain their basic properties • The impact that changes in temperature have on states of matter and the implications this has on the world at large e.g. Global Warming

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Sound	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How sounds are made, associating some of them with something vibrating • Vibrations from sounds travel through a medium to the ear • There are patterns between the pitch of a sound and features of the object that produced it • There are patterns between the volume of a sound and the strength of the vibrations that produced it • That sounds get fainter as the distance from the sound source increases 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored and identified the way sound is made through vibration in a range of different musical instruments from around the world • Found out how the pitch and volume of sounds can be changed in a variety of ways <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses • Making and playing their own instruments by using what they have found out about pitch and volume. • Recording their findings 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How sounds are made, how we hear sounds and why hearing is important in our everyday lives • The patterns between pitch and volume and the objects that produced the sound

	Know	Do	Understand
Living things and their habitats	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Living things can be grouped in a variety of ways • How to use classification keys to help group, identify and name a variety of living things in their local and wider environment • How to sort vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; • How to sort invertebrates into snails and slugs, worms, spiders, and insects. • How to sort plants into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses • Ways in which environments can change • The possible dangers this can pose to living things. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Used the local environment throughout the year to raise and answer questions • Identified and studied plants and animals in their habitat • Identified how the habitat changes throughout the year • Explored possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants • Explored 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 <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Using and making simple guides or keys to explore and identify local plants and animals • Making a guide to local living things • Raising and answering questions based on their observations of animals • Raising and answering question based on and what they have found out about other animals that they have researched 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to use classification keys to help group, identify and name a variety of living things in their local and wider environment • That we as humans have a responsibility to have a positive impact on the environment around us so that we do not cause harm to the animals and plants within it

	Know	Do	Understand
Electricity	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Common appliances that run on electricity • How to construct a simple series electrical circuit • How to name basic parts of a simple series electrical circuit, including cells, wires, bulbs, switches and buzzers • 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 • A switch opens and closes a circuit • How to identify whether or not a lamp lights in a simple series circuit based on whether the switch is open or closed • Some common conductors, such as water, copper, aluminium, gold, and silver • That metals are good conductors • Some common insulators, such as glass, plastic, rubber, air, and wood 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Constructed simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches • Used their circuits to create simple devices • Drawn the circuit as a pictorial representation (not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6) • Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage • Been taught about precautions for working safely with electricity <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The importance of electricity in our everyday lives and how it can improve the quality of lives for humans • How to construct and test simple series circuits using a variety of different component parts • How to be safe with electricity applying their knowledge of insulators and conductors

Year 4/5/6 (Year B)

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Earth and Space	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The Sun is a star at the centre of our solar system • Our solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune • Pluto was reclassified as a 'dwarf planet' in 2006 • The movement of the Earth, and other planets, relative to the Sun in the solar system • A moon is a celestial body that orbits a planet • Earth has one moon; Jupiter has four large moons and numerous smaller ones • The movement of the Moon relative to the Earth • The Sun, Earth and Moon are approximately spherical bodies • The Earth's rotation is the reason for day and night and the apparent movement of the sun across the sky. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Created a model of the Sun and Earth that enables them to explain day and night • Found out about the way that ideas about the solar system have developed, understanding 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. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Comparing the time of day at different places on the Earth through internet links and direct communication • Creating simple models of the solar system • Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day • Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That the Earth is just one small part of our solar system and its relation to the other planets • That the sun is the centre of our solar system and provides all light and heat which is essential for life as we know it

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The changes as humans develop to old age • Infancy means neonate and up to one year age) • Toddler means one to five years of age • Childhood means three to eleven years old) - early childhood is from three to eight years old, and middle childhood is from nine to eleven years old. • Adolescence or teenage means from 12 to 18 years old • Adulthood is 18 years and above • The changes experienced in puberty • For example, children get taller, heavier and stronger. • There are also changes in children's sexual organs, brains, skin, hair, teeth and sweatiness. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Drawn a timeline to indicate stages in the growth and development of humans <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Researching the gestation periods of other animals and comparing them with humans • Finding out and recording the length and mass of a baby as it grows 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That all humans go through puberty and that this is a time of great change and so great understanding and acceptance is needed as well • That humans babies develop in the womb of their mother and the gestation period is 40 weeks

	Know	Do	Understand
Forces	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • That Galileo Galilei dropped weights off of the Leaning Tower of Pisa, showing that gravity causes objects of different masses to fall with the same acceleration • That Isaac Newton came up with gravitational theory in 1665, or 1666, after watching an apple fall • The effects of air resistance, water resistance and friction, that act between moving surfaces • Some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Observed falling objects and recorded findings • Explored the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. • Experienced forces that make things begin to move, get faster or slow down. • Explored the effects of friction on movement • Explored the effects of levers, pulleys and simple machines on movement <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Designing and making a variety of parachutes • Carrying out fair tests to determine which designs are the most effective • Exploring resistance in water by making and testing boats of different shapes 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That the gravity that keeps us and objects rooted to the floor is the same gravity that keeps the planets in our solar system in orbit • The effects of air resistance, water resistance and friction, that act between moving surfaces

	Know	Do	Understand
Living things and their habitats	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The life cycle of a mammal • The life cycle of an amphibian • The life cycle of a fish • The life cycle of a bird • The differences in the life cycles of a mammal, an amphibian, an insect and a bird • The life process of reproduction in some plants and animals • The role that David Attenborough played in documenting living things and their habitats and sharing it with the world 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Studied and raised questions about their local environment throughout the year • Observed 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 <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Asking questions and suggesting reasons for similarities and differences • Observing changes in an animal over a period of time (for example, by hatching and rearing chicks) • Comparing how different animals reproduce and grow 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The similarities and differences in different life cycles in mammals, amphibians, insects and birds • How important the world of naturalists and animal behaviourists is in understanding animals and how to help and protect them

	Know	Do	Understand
Rocks	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How different rocks are formed • Where in the world you can find different types of rocks • The formation of different rocks 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Drawn detailed pictures of each rock type and labelled them accurately <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Asking and answering scientific questions • Investigating the similarities and differences between different rocks 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How different rocks are formed and why

	<i>Know</i>	<i>Do</i>	<i>Understand</i>
Evolution and inheritance	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Living things have changed over time • Fossils provide information about living things that inhabited the Earth millions of years ago • Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Characteristics are passed from parents to their offspring. For instance, what happens when labradors are crossed with poodles. • Variation in offspring over time can make animals more or less able to survive in particular environments, for example, how giraffes' necks got longer, or the development of insulating fur on the arctic fox • Animals and plants are adapted to suit their environment in different ways • Adaptation may lead to evolution • About the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels • Analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers. 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How animals and plants are adapted to suit their environment in different ways and adaptation may lead to evolution • That changes that humans make to different habitats and environments can be detrimental to the animals and plants that live there as they are especially adapted to suit it

Year 4/5/6 (Year C)

	Know	Do	Understand
Electricity	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • The brightness of a lamp or the volume of a buzzer is dependent on the number and voltage of cells used in the circuit • How to compare and give reasons for variations in how components function • How to explain the the brightness of bulbs, the loudness of buzzers and the on/off position of switches • The recognised symbols in circuit diagrams • How to create a diagram representing a simple circuit using recognised symbols • To take the necessary precautions for working safely with electricity 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Constructed simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. • Drawn diagrams to represent a simple circuit • Note: Pupils are expected to learn only about series circuits, not parallel circuits. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Systematically identifying the effect of changing one component at a time in a circuit • Recording findings appropriately 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to be safe when working with electricity and electrical components • How to create a diagram representing a simple circuit using recognised symbols

	Know	Do	Understand
Light	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Light appears to travel in straight lines • Objects are seen because they give out or reflect light into the eye • We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • How to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Talked about what happens with light and shadows and made predictions <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works • Investigating the relationship between light sources, objects and shadows by using shadow puppets • Extending their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How an understanding of light and shadows is applied to the design of everyday objects such as rear-view mirrors on cars • How to investigate the relationship between light sources, objects and shadows

	Know	Do	Understand
Properties and changes of materials	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • Some materials will dissolve in liquid to form a solution • Melting and dissolving are different processes • How to recover a substance from a solution • How to use knowledge of solids, liquids and gases to decide how mixtures might be separated • For example through filtering, sieving and evaporating • How to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Dissolving, mixing and changes of state are reversible changes • Some changes result in the formation of new materials, and that this kind of change is not usually reversible • How chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton • Changes associated with burning and the action of acid on bicarbonate of soda are not reversible 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored reversible changes, including, evaporating, filtering, sieving, melting and dissolving • Explored changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' • Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes. • Researching and discussing how chemical changes have an impact on our lives, for example, cooking • Discussing the creative use of new materials such as polymers, super-sticky and super-thin materials 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • How to compare and group together everyday materials on the basis of their properties • How to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials

	Know	Do	Understand
Living things and their habitats	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How living things are classified into broad groups according to common observable characteristics • How to identify microorganisms, plants and animals • That broad groupings, such as microorganisms, plants and animals can be subdivided. • How to classify invertebrates (such as insects, spiders, snails, worms) • How to classify vertebrates (fish, amphibians, reptiles, birds and mammals) • The similarities and differences between different broad groups • How to give reasons for classifying plants based on specific characteristics • How to give reasons for classifying animals based on specific characteristics • That Carl Linnaeus (1707 – 1778) is often called the Father of Taxonomy. His system for naming, ranking, and classifying organisms is still in wide use today 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Built on their learning about grouping living things in year 4 by looking at the classification system in more detail. • Classified animals into commonly found invertebrates through direct observation • Discussed reasons why living things are placed in one group and not another. • Found out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Using classification systems and keys to identify some animals in the immediate environment • Using classification systems and keys to identify some plants in the immediate environment. • Researching unfamiliar animals and plants from a broad range of other habitats • Deciding where they belong in the classification system 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • Similarities and differences between different broad and sub-categories of animals and plants – recognising their importance within the ecosystem and habitat they live in • How to use classification systems and keys to identify animals and plants within the local area

	Know	Do	Understand
Sound	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • That sounds vary and can be made in different ways • How the ear works • What causes an echo to occur 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Drawn and labelled a diagram of the ear • Experimented with making different sounds • Experimented with how far sound can travel <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Conducting a fair test testing whether or not distance effects the volume of a sound 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • That the further away a sound gets, the fainter it becomes • How the ear works

	Know	Do	Understand
Animals including humans	<p>By the end of the unit children should know...</p> <ul style="list-style-type: none"> • How to identify and name the main parts of the human circulatory system, • The functions of the heart, blood vessels and blood • The impact of diet, exercise, drugs and lifestyle on the way their bodies' function • 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 • The ways in which nutrients and water are transported within animals, including humans 	<p>By the end of the unit children should have...</p> <ul style="list-style-type: none"> • Explored and answered questions that help them to understand how the circulatory system enables the body to function <p>Worked scientifically by:</p> <ul style="list-style-type: none"> • Exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health 	<p>By the end of the unit children should understand...</p> <ul style="list-style-type: none"> • The functions of the heart, blood vessels and blood and how to identify them in the body • 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