



'Together We Grow: Together We Give' - Ezekiel 47 : 12



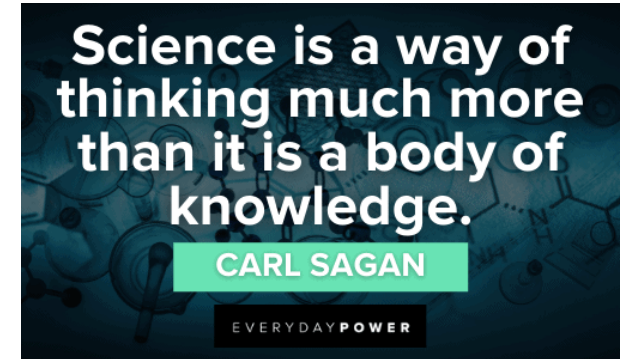
Wimborne St Giles
CE First School

Science Curriculum Overview

Love, Hope, Joy

At Wimborne St Giles, we believe that science is not just about new technology, inventions or new medicines. We believe that science is a way of helping the brain grow in finding new knowledge and helps us defeat our curiosity of how the world develops and works today.

Science is important because it has helped form the world that we live in today.



Our Vision:

Through our Science curriculum, we aim to develop what we believe to be the 'essential characteristics of a 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, including fieldwork.
- A passion for science and its application in past, present and future technologies.
- Equip and empower children to develop a deep appreciation of the natural world and how beautiful it is.
- Provide opportunities to experience the awe and wonder that the world gives us.

Science Curriculum Overview

	Autumn		Spring		Summer	
EYFS	Seasonal changes, Natural world inc plans and animals, human body & growth, nutrition, senses		Seasonal changes, Natural world inc plans and animals, human body & growth, nutrition, senses		Seasonal changes, Natural world inc plans and animals, human body & growth, nutrition, senses	
KS1	Every day materials and their uses		Plants		Animals inc humans Living things and their habitats	
KS2 a	Animals inc humans (skeleton & muscles)	Light	Electricity		Living things and habitats	Rocks
KS2 b	Animals inc humans (digestion & nutrition)	Sound	Forces and magnets		Plants	States of matter

Disciplinary concepts/second order concepts *Substantive knowledge is the unit						
Pattern	Change	Compare and contrast	Categorisation	Structure and function	Cause and effect	Variation
First order concepts:	Biology		Physics		Chemistry	Working Scientifically
EYFS	Understanding the world		Understanding the world		Understanding the world	
Year 1 Year 2	<u>Plants</u> Structure and function Variation Categorisation <u>Animal including humans</u> Change Categorisation Structure and function <u>Living things and their habitats</u> Variation Compare and contrast Change		<u>Seasonal changes and weather</u> Pattern Change Compare and contrast		<u>Everyday materials</u> Compare and contrast Categorisation Change Pattern	
Year 3	<u>Plants</u> Structure and function Variation Categorisation <u>Animals including humans</u> Change		<u>Light</u> Pattern Cause and effect <u>Forces and magnets</u>		<u>Rocks</u> Compare and contrast Cause and effect	

	Categorisation Structure and function	Cause and effect Compare and contrast		
Year 4	<u>Living things and their habitats</u> Variation Compare and contrast Categorisation	<u>Sound</u> Pattern Cause and effect <u>Electricity</u> Cause and effect Compare and contrast	<u>States of matter</u> Compare and contrast Cause and effect Pattern Change	

Working Scientifically Skills Progression

Working Scientifically

‘Working scientifically’ is described separately at the beginning of the progression document but must always be taught through and clearly related to science content.

EYFS

During EYFS, pupils should be encouraged to be curious and inquisitive about the world we live in and how things work. Through their play and other activities, they should be encouraged to ask questions, make predictions, carry out observations, test and explain their ideas.

Key vocabulary:

what, why, how, maybe, test, check, prediction, observation

Year 1

Year 2

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Key vocabulary (from EYFS and):

question, identify, sort, group, explore, compare, change, measure, record, observe, diagram, data, describe

Year 3

Year 4

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

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Key vocabulary (from previous years and):

experiment, prediction, conclusion, investigation, enquiry, comparison, classify, fair, criteria, contrast, research, cause, effect

Working Scientifically

During EYFS, pupils should be encouraged to be curious and inquisitive about the world we live in and how things work. Through their play and other activities, they should be encouraged to ask questions, make predictions, carry out observations, test and explain their ideas.

Key vocabulary: what, why, how, maybe, test, check, prediction, observation, investigation, experiment

Materials

Development Matters	Knowledge	Skills
<p>N1</p> <ul style="list-style-type: none"> Repeat actions that have an effect Explore materials with different properties Explore natural materials, indoors and outdoors <p>N2</p> <ul style="list-style-type: none"> Explore collections of materials with similar and/or different properties Talk about the differences between materials and changes they notice 	<ul style="list-style-type: none"> I know some similarities and differences in relation to materials inc materials that will attract a magnet 	<ul style="list-style-type: none"> I can identify similarities and differences in relation to materials I can use the best materials for floating in water

Vocabulary Materials, glass, wood, paper, cardboard, metal, textiles, plastic, float, sink

Natural world/Senses

Development Matters	Knowledge	Skills
<p>N1</p> <ul style="list-style-type: none"> Explore and respond to different natural phenomena in their setting and on trips <p>N2</p> <ul style="list-style-type: none"> Use all their senses in hand-on exploration of natural materials 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 <p>Reception</p> <ul style="list-style-type: none"> Explore the natural world around them Describe what they see hear and feel whilst outside Understand the effects of changing seasons on the natural world around them 	<ul style="list-style-type: none"> I know there are 5 senses I know I see with my eyes I know I hear with my ears I know I feel with touch I know I taste with my tongue I know I smell with my nose I know how to ask questions about the world through using my senses - feeling, hearing, seeing I know some important processes and changes in the natural world around them, including the seasons 	<ul style="list-style-type: none"> I understand the effect of changing seasons on the natural world around me I can dress appropriately for the weather

Vocabulary	Senses, touch, taste, hear, see, smell, hands, tongue, taste buds, listen, ears, eyes, nose	
States of matter		
Development Matters	Knowledge	Skills
Reception <ul style="list-style-type: none"> Explore the natural world around them 	<ul style="list-style-type: none"> I know some important processes and changes in the natural world around them, changing states of matter. 	<ul style="list-style-type: none"> I can melt ice effectively to turn into water
Vocabulary	Change, process, melt, freeze, hot, cold	
Plants		
Development Matters	Knowledge	Skills
N2 <ul style="list-style-type: none"> Plant seeds and care for growing plants Understand the key features of the lifecycle of a plant 	<ul style="list-style-type: none"> I know how to care for growing plants. I know about the life cycle of a plant I know about growth, decay and changes over time I know some similarities and differences in relation to living things. 	<ul style="list-style-type: none"> I plant seeds and care for growing plants. I understand the key features of the life cycle of a plant I am developing an understanding of growth, decay and changes over time I identify similarities and differences in relation to living things
Vocabulary	Seed, stem, shoot, root, leaf, petal, soil, sun, rain/water, sunflower, life cycle	
Animals		
Development Matters	Knowledge	Skills
N2 <ul style="list-style-type: none"> Understand the key features of the lifecycle of an animal 	<ul style="list-style-type: none"> I know how to care for animals I know some of the features of my own immediate environment and how they might vary from one another (farm/zoo) I know about life cycle of a butterfly I know I need to respect and care for the natural environment and all living things. I know which animals are meat or plant eaters 	<ul style="list-style-type: none"> I begin to understand the life cycle of a butterfly I understand the need to respect and care for the natural environment and all living things. I can talk about the features of my own immediate environment and how environments might vary from one another. I can identify which animals are meat or plant eaters
Vocabulary	Animal names- lion, elephant, frog etc. Habitats- desert, forest, savannah, ocean etc. Meat-eaters, plant eaters, caterpillar, butterfly, egg, chrysalis, life cycle	
Key vocabulary	Science, experiment, test, fair, why, senses, world, plants – leaf, stem, root, flower, animals, humans, materials - waterproof, natural, change, growth, decay, environment	

KS1 Everyday materials and their uses

Key Scientist: John Dunlop, McAdam, Charles Macintosh

Key concepts: Compare and contrast Categorisation Change Pattern

Prior learning: Notice differences and similarities of materials, changing states of matter,

Common misconceptions: Some children may think: • only fabrics are materials • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <p>Year 1:</p> <ul style="list-style-type: none">distinguish between an object and the material from which it is madeidentify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rockdescribe the simple physical properties of a variety of everyday materialscompare and group together a variety of everyday materials on the basis of their simple physical properties <p>Year 2</p> <ul style="list-style-type: none">identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular usesfind out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	<p>Year 1:</p> <p>All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.</p> <p>Year 2:</p> <p>All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.</p>	<p>Year 1:</p> <ul style="list-style-type: none">describe the properties of different materialssort and classify using different criteriatest properties of materials. <p>Year 2:</p> <ul style="list-style-type: none">Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use.Can label a picture or diagram of an object made from different materialsFor a given object can identify what properties a suitable material needs to haveWhilst changing the shape of an object can describe the action usedCan use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannotCan recognise that a material may come in different forms which have different properties

Key vocabulary: Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, nonreflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Enrichment:

KS1 Plants

Key Scientist: Jane Colden (Botanist)

Key concepts: Structure and function, Variation Categorisation

Prior learning: Notice seasonal changes, explore and observe plants and the natural world.

Common misconceptions: Some children may think: • plants are flowering plants grown in pots with coloured petals and leaves and a stem • trees are not plants • all leaves are green • all stems are green • a trunk is not a stem • blossom is not a flower. plants are not alive as they cannot be seen to move • seeds are not alive • all plants start out as seeds • seeds and bulbs need sunlight to germinate

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <p>Year 1</p> <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees <p>Year 2</p> <ul style="list-style-type: none"> 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 	<p>Year 1:</p> <p>Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.</p> <p>Year 2:</p> <p>Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.</p>	<p>Year 1:</p> <ul style="list-style-type: none"> Can name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same. <p>Year 2:</p> <ul style="list-style-type: none"> Can describe how plants that they have grown from seeds and bulbs have developed over time Can identify plants that grew well in different conditions Can spot similarities and difference between bulbs and seeds Identifying the different requirements of different plants Make close observations of seeds and bulbs. Classify seeds and bulbs. Research and plan when and how to plant a range of seeds and bulbs. Make close observations and measurements Make comparisons
<p>Key vocabulary: Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, Names of trees in the local area Names of garden and wild flowering plants in the local area, light, shade, sun, warm, cool, water, grow, healthy, evergreen, deciduous</p>		
<p>Enrichment: Forest school, nature walks, vegetable growing, parent visits, visit farms, Kyneston Mill</p>		

KS1 Animals (including humans) Living things and their habitats

Key scientist: Chris Packham

Key concepts: Change, Categorisation, Structure and function, Variation, Compare and contrast

Prior learning: use senses, notice difference and similarities of animals (inc humans) draw animals.

Common misconceptions: Some children may think: • only four-legged mammals, such as pets, are animals • humans are not animals • insects are not animals • all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group • amphibians and reptiles are the same, an animal's habitat is like its 'home' • plants and seeds are not alive as they cannot be seen to move • fire is living • arrows in a food chain mean 'eats' • all animals that live in the sea are fish • respiration is breathing • breathing is respiration.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <p>Year 1</p> <ul style="list-style-type: none"> • 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 • <p>Year 2</p> <ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 	<p>Year 1: Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.</p> <p>Year 2: All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and</p>	<p>Year 1:</p> <ul style="list-style-type: none"> • Describe the key features of named animals • Can label key features on a picture/diagram • Describe what a range of animals eat • Label parts of the body • Sort and group animals using similarities and differences • Use simple charts • Use secondary resources to find out what animals eat. • Talk about their findings from investigations using appropriate vocabulary • Make first-hand, close observations of animals from each of the groups. • Compare two animals/ people from the same or different groups. • Classify animals/people using a range of features. • Identify animals by matching them to named images. • Take measurements of parts of their body. • Compare parts of their own body. • Look for patterns between people • Investigate human senses <p>Year 2:</p> <ul style="list-style-type: none"> • Name a range of animals and plants that live in a habitat and micro-habitats that they have studied • Talk about how the features of these animals and plants make them suitable to the habitat • Talk about what the animals eat in a habitat and how the plants provide shelter for them

<ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 	<p>find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses.</p>	<ul style="list-style-type: none"> Construct a food chain that starts with a plant and has the arrows pointing in the correct direction Sort into living, dead and never lived Give key features that mean the animal or plant is suited to its micro-habitat Using a food chain, explain what animals eat Explain in simple terms why an animal or plant is suited to a habitat Classify objects found in the local environment. Observe animals and plants carefully, drawing and labelling diagrams. Create simple food chains for a familiar local habitat from first-hand observation and research or from information given e.g. in picture books (Gruffalo) Describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages State the basic needs of animals, including humans, for survival State the importance for humans of exercise, eating the right amounts of different types of food, and hygiene Describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults Measure/observe how animals, including humans, grow. Explain how development and health might be affected by differing conditions and needs being met/not met Explore the effect of exercise on their bodies. Classify food in a range of ways.
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Key vocabulary: Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves • Names of animals experienced first-hand from each vertebrate group • Parts of the body including those linked to RSE teaching • Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue, Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed • Names of local habitats e.g. pond, woodland etc. • Names of micro-habitats e.g. under logs, in bushes etc, Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types

Enrichment: vet visit, hatching animals, forest school, zoo / animal park visit, medical professional visit, pond dipping, mini beast hunt

KS2 Year A: Animals including humans (skeleton & muscles)

Key scientist: Leonardo Da Vinci/ Andreas Vesalius

Key concepts: Categorisation , Structure and function

Prior learning: Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (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). (Y2 - Animals, including humans) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)

Links to future learning: Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. (Y6 - Animals, including humans)

Common misconceptions: Some children may think: • arrows in a food chains mean 'eats' • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • snakes are similar to worms, so they must also be invertebrates • invertebrates have no form of skeleton.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • identify that humans and some other animals have skeletons and muscles for support, protection and movement • identify the different types of teeth in humans and their simple functions 	<p>Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p> <p>Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</p> <p>Living things can be classified as producers, predators and prey according to their place in the food chain.</p>	<ul style="list-style-type: none"> • Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection • Can describe how muscles and joints help them to move • Can classify food into those that are high or low in particular nutrients • Can answer their questions about nutrients in food, based on their gathered evidence • Can talk about the nutrient content of their daily food plan • Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons • Use secondary sources to research the parts and functions of the skeleton. • Investigate patterns asking questions such as: ▪ Can people with longer legs run faster? • Can people with bigger hands catch a ball better? • Compare, contrast and classify skeletons of different animals. • Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for

		<ul style="list-style-type: none"> • Can name producers, predators and prey within a habitat • Record the teeth in their mouth • Explain the role of the different types of teeth • Explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores • Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. • Use food chains to identify producers, predators and prey within a habitat. • Use secondary sources to identify animals in a habitat and find out what they eat.
<p>Key vocabulary: skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine, mouth, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain.</p>		
<p>Enrichment: physiotherapist / dentist visit, zoo / animal park visit, nutritionist, Life Bus,</p>		

KS2 Year A: Light

Key scientist: Thomas Eddison

Key concept: **Pattern, Cause and effect**

Prior learning: 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) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)

Links to future learning: Recognise that light appears to travel in straight lines. (Y6 - Light) • 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. (Y6 - Light) • 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. (Y6 - Light) • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6 - Light)

Common misconceptions: Some children may think: • we can still see even where there is an absence of any light • our eyes 'get used to' the dark • the moon and reflective surfaces are light sources • a transparent object is a light source • shadows contain details of the object, such as facial features on their own shadow • shadows result from objects giving off darkness.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 	<p>We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.</p>	<ul style="list-style-type: none"> • Describe how we see objects in light and can describe dark as the absence of light • Define transparent, translucent and opaque • Describe how shadows are formed • Explore how different objects are more or less visible in different levels of lighting. • Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Explore shadows which are connected to and disconnected from the object • Explain, giving examples, that objects are not visible in complete darkness • Describe, demonstrate and make predictions about patterns in how shadows vary

Key vocabulary: Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous

Enrichment: Solar farm visit, solar powered toys, twilight walk, Winchester Science Centre

KS2 Year A : Electricity

Key scientist: Michael Faraday/Nikola Tesla

Key concept: Cause and effect Compare and contrast

Prior learning: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.

Links to future learning: • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. (Y6 - Electricity) • 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. (Y6 - Electricity) • Use recognised symbols when representing a simple circuit in a diagram. (Y6 - Electricity)

Common misconceptions: Some children may think: • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 	<p>Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.</p>	<ul style="list-style-type: none"> • Name the components in a circuit • Make electric circuits • Control a circuit using a switch • Communicate structures of circuits using drawings which show how the components are connected • Identify that metals are good conductors and non-metals are insulators • Incorporate a switch into a circuit to turn it on and off • Connect a range of different switches • Justify choice of materials for making different parts of a switch • Describe how their switch works • Construct a range of circuits. • Explore which materials can be used instead of wires to make a circuit. • Classify the materials that were suitable/not suitable for wires. • Explore how to connect a range of different switches and investigate how they function • Apply knowledge of conductors and insulators to design and make different types of switch. • Make circuits that can be controlled <p>N.B. Children should be given one component at a time to add to circuits.</p>

Key vocabulary: Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.

Enrichment: Winchester Science Centre, Solar Farm visit, Electricity board / electrician visit,

KS2 Year A : Living Things and Habitats

Key scientist: David Attenborough/Dr Jane Goodall

Key concepts: Compare and contrast Change

Prior learning: Add EYFS 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) • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) • Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)

Links to future learning: 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 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 microorganisms, 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)

Common misconceptions: Some children may think: • the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain • there is always plenty of food for wild animals • animals are only land-living creatures • animals and plants can adapt to their habitats, however they change • all changes to habitats are negative.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. 	<p>Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.</p>	<ul style="list-style-type: none"> • Name living things living in a range of habitats, giving the key features that helped them to identify them • Observe plants and animals in different habitats throughout the year. • Compare and contrast the living things observed. • Use classification keys to name unknown living things. • Classify living things found in different habitats based on their features. • Create a simple identification key based on observable features. • Use fieldwork to explore human impact on the local environment • Use secondary sources to find out about how environments may change.

Key vocabulary: Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

Enrichment: Forest school, zoo / animal park visit, conservation visit, RSPA, RSPB, Youth Climate Summit

KS2 Year A : Rocks

Key scientist: Mary Anning

Key concepts: Compare and contrast, Cause and effect

Prior learning: Add EYFS 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)

Links to future learning: 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) • The composition of the Earth. (KS3) • The structure of the Earth. (KS3) • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)

Common misconceptions: Some children may think: • rocks are all hard in nature • rock-like, man-made substances such as concrete or brick are rocks • materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' • certain found artefacts, like old bits of pottery or coins, are fossils • a fossil is an actual piece of the extinct animal or plant • soil and compost are the same thing.

National Curriculum

Knowledge

Skills

Pupils should be taught to:

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

Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.

- Name types of rock and give physical features of each
- Explain how a fossil is formed
- Explain that soils are made from rocks and also contain living/dead matter
- Observe rocks closely including how they change over time.
- Classify rocks in a range of ways, based on their appearance.
- Investigate and test rocks and soils
- Use data to present results
- Research using secondary sources how fossils are formed
- Classify soils in a range of ways based on their appearance.
- Observe how soil can be separated.
- Identify plant/animal matter and rocks in samples of soil

Key vocabulary: Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil

Enrichment: Jurassic Coast, PGL, Palaeontologist visit, museum visit,

KS2 Year B: Animals including humans (digestion & nutrition)

Key scientist: William Beaumont

Key concepts: Change, Categorisation, Structure and function

Prior learning: • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)

Links to future learning: • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans) • Describe the ways in which nutrients and water are transported within animals, including humans. (Y6 - Animals, including humans)

Common misconceptions: Some children may think: • certain whole food groups like fats are ‘bad’ for you • certain specific foods, like cheese are also ‘bad’ for you • diet and fruit drinks are ‘good’ for you • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes “poo” and the drink becomes “wee”.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 • 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 	<p>Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients.</p> <p>Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.</p>	<ul style="list-style-type: none"> • Can name the nutrients found in food • Can state that to be healthy we need to eat the right types of food to give us the correct amount of nutrients Can classify food into those that are high or low in particular nutrients • Can answer their questions about nutrients in food, based on their gathered evidence • Can talk about the nutrient content of their daily food plan • Classify food in a range of ways. • Use food labels to explore the nutritional content of a range of food items. • Use secondary sources to find out the types of food that contain the different nutrients. • Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? • Plan a daily diet to contain a good balance of nutrients. • Explore the nutrients contained in fast food. • Use secondary sources to research the parts and functions of the skeleton. • Investigate patterns asking questions • Compare, contrast and classify skeletons of different animals.

		<ul style="list-style-type: none">• Can sequence the main parts of the digestive system• Explain what happens in each part of the digestive system
Key vocabulary: Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus.		
Enrichment: Cooking, Chef visit, nutritionist, Life Bus,		

KS2 Year B: Sound

Key scientists: Da Vinci, Galileo, Doppler

Key concept: **Pattern, Cause and effect**

Prior learning: 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)

Links to future learning: • Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3) • Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3) • Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3) • Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. (KS3) • Auditory range of humans and animals. (KS3) • Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3) • Waves transferring information for conversion to electrical signals by microphone. (KS3)

Common misconceptions: Pitch and volume are frequently confused, as both can be described as high or low. Some children may think: • sound is only heard by the listener • sound only travels in one direction from the source • sound can't travel through solids and liquids • high sounds are loud and low sounds are quiet.

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 	<p>A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</p>	<ul style="list-style-type: none"> • Explain what happens when you strike a drum or pluck a string • use a diagram to show how sounds travel from an object to the ear • Demonstrate how to increase or decrease pitch and volume using musical instruments or other objects • Use data to identify patterns in pitch and volume • Classify sound sources. • Explore making sounds with a range of objects, such as musical instruments and other household objects. • Explore how string telephones or ear gongs work. • Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. • Measure sounds over different distances. • Measure sounds through different insulation materials. • Name sound sources and state that sounds are produced by the vibration of the object • State that sounds travel through different mediums such as air, water, metal • Demonstrate how the pitch of a sound are linked to the features of the object that produced it • Explain how to change the volume of a sound

		<ul style="list-style-type: none">• Demonstrate that sounds get fainter as the distance from the sound source increases
Key vocabulary: Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		
Enrichment: Winchester Science Centre, musician visit, BSO Concert		

KS2 Year B : Forces and Magnets

Key scientist: Isaac Newton

Key concept: Cause and effect Compare and contrast

Prior learning: Add EYFS 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)

Links to future learning: Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) • Magnetic fields by plotting with compass, representation by field lines. (KS3) • Earth's magnetism, compass and navigation. (KS3)

Common misconceptions: Some children may think: • the bigger the magnet the stronger it is • all metals are magnetic.

National Curriculum	Knowledge	Skills
<ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing 	<p>A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.</p>	<ul style="list-style-type: none"> • Describe how objects move on different surfaces • Can use their results to make predictions for further tests • Can name a range of types of magnets and show how the poles attract and repel • Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets • Carry out investigations • Explore what materials are attracted to a magnet. • Classify materials according to whether they are magnetic. • Explore the way that magnets behave in relation to each other. • Use a marked magnet to find the unmarked poles on other types of magnets. • Explore how magnets work in different contexts • Devise an investigation

Key vocabulary: Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

Enrichment: Winchester Science Centre,

KS2 Year B : Plants

Key scientist: Carl Linnaeus

Key concepts: **Structure and function, Variation, Categorisation**

Prior learning: **Add EYFS** • Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants)

Links to future learning: Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) • Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)

Common misconceptions: Some children may think: • plants eat food • food comes from the soil via the roots • flowers are merely decorative rather than a vital part of the life cycle in reproduction • plants only need sunlight to keep them warm • roots suck in water which is then sucked up the stem.

National Curriculum	Knowledge	Skills
<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<p>Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.</p>	<ul style="list-style-type: none"> • Explain the function of the parts of a flowering plant • Describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination • Give different methods of pollination and seed dispersal • Observe what happens to plants over time when the leaves or roots are removed. • Investigate what happens to plants when they are put in different conditions. • Classify seeds in a range of ways, including by how they are dispersed. • Explain observations made during investigations

Key vocabulary: Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)

Enrichment: Bee keeper talk. Forest school, vegetable growing, botanist, garden visit, Flower festival, farm visit

KS2 Year B : States of Matter

Key Scientist: Marie Curie

Key concepts: Compare and contrast Cause and effect Pattern Change

Prior learning: Add EYFS 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) • 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)

Links to future learning: 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. (Y5 - Properties and changes of materials) • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. (Y5 - Properties and changes of materials) • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. (Y5 - Properties and changes of materials) • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (Y5 - Properties and changes of materials) • Demonstrate that dissolving, mixing and changes of state are reversible changes. (Y5 - Properties and changes of materials) • 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. (Y5 - Properties and changes of materials)

Common misconceptions: Some children may think: • ‘solid’ is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one piece • substances made of very small particles like sugar or sand cannot be solids • particles in liquids are further apart than in solids and they take up more space • when air is pumped into balloons, they become lighter • water in different forms – steam, water, ice – are all different substances • all liquids boil at the same temperature as water (100 degrees) • melting, as a change of state, is the same as dissolving • steam is visible water vapour (only the condensing water droplets can be seen)

National Curriculum	Knowledge	Skills
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 	<p>A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific</p>	<ul style="list-style-type: none"> • The key concept of change should be explored through all aspects of this unit • Observe closely and classify a range of solids, liquids and gases • Observe a range of materials melting • Investigate the melting point of different materials • Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. • Use a thermometer to measure temperatures • Observe and explain water evaporating and condensing • Set up investigations to explore changing the rate of evaporation • Use secondary sources to find out about the water cycle.

temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100C. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.

- Justify why something is a solid liquid or gas
- Explain what affects how quickly a solid melts

Key vocabulary: Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle

Enrichment: Winchester Science Centre, Cookery,