




Knowledge Statements Y1-6

Knowledge Statements Y1

	Year	1	Topic	Plants
<input type="checkbox"/> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. <input type="checkbox"/> Identify and describe the basic structure of a variety of common flowering plants, including trees.				

Prior learning	Future learning
<input type="checkbox"/> 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. (Early Learning Goal)	<input type="checkbox"/> Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) <input type="checkbox"/> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants) <input type="checkbox"/> Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) <input type="checkbox"/> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Y3 - Plants) <input type="checkbox"/> Investigate the way in which water is transported within plants. (Y3 Plants)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
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.	<input type="checkbox"/> Can name trees and other plants that they see regularly <input type="checkbox"/> 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 <input type="checkbox"/> Can point out trees which lost their leaves and those that kept them the whole year <input type="checkbox"/> Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green
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	

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


Apply knowledge in familiar related contexts, including a range of enquiries

Activities

- ☐ Make close observations of leaves, seeds, flowers etc.
- ☐ Compare two leaves, seeds, flowers etc.
- ☐ Classify leaves, seeds, flowers etc. using a range of characteristics.
- ☐ Identify plants by matching them to named images.
- ☐ Make observations of how plants change over a period of time.
- ☐ When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.

Possible evidence

- ☐ Can sort and group parts of plants using similarities and differences
- ☐ Can use simple charts etc. to identify plants
- ☐ Can collect information on features that change during the year
- ☐ Can use photographs to talk about how plants change over time

	Year	1	Topic	Animals, including humans
	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. <input type="checkbox"/> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. <input type="checkbox"/> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). <input type="checkbox"/> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 			


Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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. (Early Learning Goal) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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. (Y2 - Living things and their habitats) <input type="checkbox"/> 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) <input type="checkbox"/> Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>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.</p> <p>Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.</p> <p>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>	<ul style="list-style-type: none"> <input type="checkbox"/> Can name a range of animals which includes animals from each of the vertebrate groups <input type="checkbox"/> Can describe the key features of these named animals <input type="checkbox"/> Can label key features on a picture/diagram <input type="checkbox"/> Can write descriptively about an animal <input type="checkbox"/> Can write a What am I? riddle about an animal <input type="checkbox"/> Can describe what a range of animals eat <input type="checkbox"/> Can play and lead 'Simon says' <input type="checkbox"/> During PE lessons, can follow instructions involving parts of the body

<p style="text-align: center;">Key vocabulary</p> <ul style="list-style-type: none"> <input type="checkbox"/> Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves <input type="checkbox"/> Names of animals experienced first-hand from each vertebrate group <input type="checkbox"/> Parts of the body including those linked to PSHE teaching (see joint document produced by the ASE and PSHE Association) <input type="checkbox"/> Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue <p>N.B. The children need to be able to name and identify a range of animals in each group e.g. name specific birds and fish. They do not need to use the terms mammal, reptiles etc. or know the key characteristics of each, although they will probably be able to identify birds and fish, based on their characteristics.</p> <p>The children also do not need to use the words carnivore, herbivore and omnivore. If they do, ensure that they understand that carnivores eat other animals, not just meat.</p> <p>Although we often use our fingers and hands to feel objects, the children should understand that we can feel with many parts of our body.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can label parts of the body on pictures and diagrams <input type="checkbox"/> Can explore objects using different senses
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> only four-legged mammals, such as pets, are animals <input type="checkbox"/> humans are not animals <input type="checkbox"/> insects are not animals <input type="checkbox"/> all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group <input type="checkbox"/> amphibians and reptiles are the same. 	

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Make first-hand, close observations of animals from each of the groups. <input type="checkbox"/> Compare two animals from the same or different groups. <input type="checkbox"/> Classify animals using a range of features. <input type="checkbox"/> Identify animals by matching them to named images. <input type="checkbox"/> Classify animals according to what they eat. <input type="checkbox"/> Make first-hand close observations of parts of the body e.g. hands, eyes. <input type="checkbox"/> Compare two people. <input type="checkbox"/> Take measurements of parts of their body. <input type="checkbox"/> Compare parts of their own body. <input type="checkbox"/> Look for patterns between people e.g. Do people with big hands have big feet? <input type="checkbox"/> Classify people according to their features. <input type="checkbox"/> Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match? 	<ul style="list-style-type: none"> <input type="checkbox"/> Can sort and group animals using similarities and differences <input type="checkbox"/> Can use simple charts etc. to identify unknown animals <input type="checkbox"/> Can create a drawing of an imaginary animal labelling its key features <input type="checkbox"/> Can use secondary resources to find out what animals eat, including talking to experts e.g. pet owners, zookeepers etc. <input type="checkbox"/> Can use first-hand close observations to make detailed drawings <input type="checkbox"/> Can name body parts correctly when talking about measurements and comparisons e.g. "My arm is x straws long." "My arm is x straws long and my leg is y straws long. My leg is longer than my arm." "We both have hands, but his are bigger than mine." "These people have brown eyes and these have blue." <input type="checkbox"/> Can talk about their findings from investigations using appropriate vocabulary e.g. "My fingers are much better at feeling than my toes" "We found that the crisps all taste the same."

	Year 1	Topic Everyday materials	<ul style="list-style-type: none"> <input type="checkbox"/> Distinguish between an object and the material from which it is made. <input type="checkbox"/> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials. <input type="checkbox"/> Compare and group together a variety of everyday materials on the basis of their simple physical properties.
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Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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. (Early Learning Goal) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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>	<ul style="list-style-type: none"> <input type="checkbox"/> Can label a picture or diagram of an object made from different materials <input type="checkbox"/> Can describe the properties of different materials
Key vocabulary	
<p>Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through</p>	


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.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Classify objects made of one material in different ways e.g. a group of object made of metal. <input type="checkbox"/> Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. <input type="checkbox"/> Classify materials based on their properties. <input type="checkbox"/> Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can sort objects and materials using a range of properties <input type="checkbox"/> Can choose an appropriate method for testing an object for a particular property <input type="checkbox"/> Can use their test evidence to answer the questions about properties e.g. "Which cloth is the most absorbent?"


	Year	1	Topic	Seasonal changes
	<input type="checkbox"/> Observe changes across the four seasons. <input type="checkbox"/> Observe and describe weather associated with the seasons and how day length varies.			

Prior learning	Future learning
<input type="checkbox"/> 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. (Early Learning Goal)	<input type="checkbox"/> Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) <input type="checkbox"/> Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space) <input type="checkbox"/> The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again.</p> <p>The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.</p>	<input type="checkbox"/> Can name the four seasons and identify when in the year they occur <input type="checkbox"/> Can describe weather in different seasons over a year <input type="checkbox"/> Can describe days as being longer (in time) in the summer and shorter in the winter <input type="checkbox"/> Can describe other features that change through the year

Key vocabulary	
<input type="checkbox"/> Weather (sunny, rainy, windy, snowy etc.) <input type="checkbox"/> Seasons (winter, summer, spring, autumn) <input type="checkbox"/> Sun, sunrise, sunset, day length	
Common misconceptions	
Some children may think: <input type="checkbox"/> it always snows in winter <input type="checkbox"/> it is always sunny in the summer <input type="checkbox"/> there are only flowers in spring and summer <input type="checkbox"/> it rains most in the winter.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Collect information about the weather regularly throughout the year. <input type="checkbox"/> Present this information in tables and charts to compare the weather across the seasons. <input type="checkbox"/> Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. <input type="checkbox"/> Present this information in different ways to compare the seasons. <input type="checkbox"/> Gather data about day length regularly throughout the year and present this to compare the seasons.	<input type="checkbox"/> Use the evidence gathered to describe the general types of weather and changes in day length over the seasons. <input type="checkbox"/> Use their evidence to describe some other features of their surroundings, e.g. themselves, animals, plants that change over the seasons <input type="checkbox"/> Demonstrate their knowledge in different ways e.g. making a weather forecast video, writing seasonal poetry, creating seasonal artwork

Knowledge Statements Y2

	Year	2	Topic	Living things and their habitat
	<ul style="list-style-type: none"> <input type="checkbox"/> Explore and compare the differences between things that are living, dead, and things that have never been alive <input type="checkbox"/> 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 <input type="checkbox"/> Identify and name a variety of plants and animals in their habitats, including micro-habitats <input type="checkbox"/> 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 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) <input type="checkbox"/> Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) <input type="checkbox"/> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) <input type="checkbox"/> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) <input type="checkbox"/> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) <input type="checkbox"/> Observe changes across the four seasons. (Y1 - Seasonal changes) 	<ul style="list-style-type: none"> <input type="checkbox"/> Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) <input type="checkbox"/> Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) <input type="checkbox"/> Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) <input type="checkbox"/> Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>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.)</p> <p>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).</p> <p>Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and 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.</p> <p>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.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can find a range of items outside that are living, dead and never lived <input type="checkbox"/> Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied <input type="checkbox"/> Can talk about how the features of these animals and plants make them suitable to the habitat <input type="checkbox"/> Can talk about what the animals eat in a habitat and how the plants provide shelter for them <input type="checkbox"/> Can construct a food chain that starts with a plant and has the arrows pointing in the correct direction
Key vocabulary	
<ul style="list-style-type: none"> <input type="checkbox"/> Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed <input type="checkbox"/> Names of local habitats e.g. pond, woodland etc. <input type="checkbox"/> Names of micro-habitats e.g. under logs, in bushes etc. 	


Common misconceptions

Some children may think:

- ☐ 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'.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Explore the outside environment regularly to find objects that are living, dead and have never lived. <input type="checkbox"/> Classify objects found in the local environment. <input type="checkbox"/> Observe animals and plants carefully, drawing and labelling diagrams. <input type="checkbox"/> Create simple food chains for a familiar local habitat from first-hand observation and research. <input type="checkbox"/> Create simple food chains from information given e.g. in picture books (Gruffalo etc.). 	<ul style="list-style-type: none"> <input type="checkbox"/> Can sort into living, dead and never lived <input type="checkbox"/> Can give key features that mean the animal or plant is suited to its micro-habitat <input type="checkbox"/> Using a food chain can explain what animals eat <input type="checkbox"/> Can explain in simple terms why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty

	Year	2	Topic	Plants
	<input type="checkbox"/> Observe and describe how seeds and bulbs grow into mature plants. <input type="checkbox"/> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.			

Prior learning	Future learning
<input type="checkbox"/> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) <input type="checkbox"/> Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)	<input type="checkbox"/> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Y3 - Plants) <input type="checkbox"/> 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. (Y3 - Plants) <input type="checkbox"/> Investigate the way in which water is transported within plants. (Y3 - Plants) <input type="checkbox"/> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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>	<input type="checkbox"/> Can describe how plants that they have grown from seeds and bulbs have developed over time <input type="checkbox"/> Can identify plants that grew well in different conditions
Key vocabulary	
<p>As for Year 1 plus light, shade, sun, warm, cool, water, grow, healthy</p>	


Common misconceptions

Some children may think:

- ☐ 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.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Make close observations of seeds and bulbs. <input type="checkbox"/> Classify seeds and bulbs. <input type="checkbox"/> Research and plan when and how to plant a range of seeds and bulbs. <input type="checkbox"/> Look after the plants as they grow – weeding, thinning, watering etc. <input type="checkbox"/> Make close observations and measurements of their plants growing from seeds and bulbs. <input type="checkbox"/> Make comparisons between plants as they grow. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can spot similarities and difference between bulbs and seeds <input type="checkbox"/> Can nurture seeds and bulbs into mature plants identifying the different requirements of different plants

	Year	2	Topic	Animals, including humans
	<ul style="list-style-type: none"> <input type="checkbox"/> Notice that animals, including humans, have offspring which grow into adults. <input type="checkbox"/> Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). <input type="checkbox"/> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) <input type="checkbox"/> 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) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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. (Y3 - Animals, including humans) <input type="checkbox"/> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) <input type="checkbox"/> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) <input type="checkbox"/> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>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.</p> <p>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.</p> <p>Good hygiene is also important in preventing infections and illnesses.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages <input type="checkbox"/> Can state the basic needs of animals, including humans, for survival <input type="checkbox"/> Can state the importance for humans of exercise, eating the right amounts of different types of food, and hygiene <input type="checkbox"/> Can name foods in each section of the Eatwell Guide

<p style="text-align: center;">Key vocabulary</p> <p>Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)</p>	
<p style="text-align: center;">Common misconceptions</p> <p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> an animal's habitat is like its 'home' <input type="checkbox"/> all animals that live in the sea are fish <input type="checkbox"/> respiration is breathing <input type="checkbox"/> breathing is respiration. 	
<p style="text-align: center;">Apply knowledge in familiar related contexts, including a range of enquiries</p>	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Ask people questions and use secondary sources to find out about the life cycles of some animals. <input type="checkbox"/> Observe animals growing over a period of time e.g. chicks, caterpillars, a baby. <input type="checkbox"/> Ask questions of a parent about how they look after their baby. <input type="checkbox"/> Ask pet owners questions about how they look after their pet. <input type="checkbox"/> Explore the effect of exercise on their bodies. <input type="checkbox"/> Classify food in a range of ways, including using the Eatwell Guide. <input type="checkbox"/> Investigate washing hands, using glitter gel. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child <input type="checkbox"/> Can measure/observe how animals, including humans, grow. <input type="checkbox"/> Show what they know about looking after a baby/animal by creating a parenting/pet owners' guide <input type="checkbox"/> Explain how development and health might be affected by differing conditions and needs being met/not met




Year	2	Topic	Uses of everyday materials
<input type="checkbox"/> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. <input type="checkbox"/> Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.			

Prior learning	Future learning
<input type="checkbox"/> Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) <input type="checkbox"/> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) <input type="checkbox"/> Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)	<input type="checkbox"/> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks) <input type="checkbox"/> Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) <input type="checkbox"/> 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) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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>	<input type="checkbox"/> 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 <input type="checkbox"/> Can label a picture or diagram of an object made from different materials <input type="checkbox"/> For a given object can identify what properties a suitable material needs to have

Key vocabulary	<input type="checkbox"/> Whilst changing the shape of an object can describe the action used <input type="checkbox"/> Can use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot <input type="checkbox"/> Can recognise that a material may come in different forms which have different properties
Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/puling, twist/twisting, squash/squashing, bend/bending, stretch/stretching	
Common misconceptions	
Some children may think: <input type="checkbox"/> only fabrics are materials <input type="checkbox"/> only building materials are materials <input type="checkbox"/> only writing materials are materials <input type="checkbox"/> the word rock describes an object rather than a material <input type="checkbox"/> solid is another word for hard.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Classify materials. <input type="checkbox"/> Make suggestions about alternative materials for a purpose that are both suitable and unsuitable <input type="checkbox"/> Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl’s costume, test materials for waterproofness to select the most appropriate for a rain hat	<input type="checkbox"/> Can sort materials using a range of properties <input type="checkbox"/> Can explain using the key properties why a material is suitable or not suitable for a purpose <input type="checkbox"/> Can begin to choose an appropriate method for testing a material for a particular property <input type="checkbox"/> Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?

Knowledge Statements Y3

	Year	3	Topic	Plants
	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. <input type="checkbox"/> 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. <input type="checkbox"/> Investigate the way in which water is transported within plants. <input type="checkbox"/> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) <input type="checkbox"/> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants) 	<ul style="list-style-type: none"> <input type="checkbox"/> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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"> <input type="checkbox"/> Can explain the function of the parts of a flowering plant <input type="checkbox"/> Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination <input type="checkbox"/> Can give different methods of pollination and seed dispersal, including examples
Key vocabulary	
Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)	


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.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Observe what happens to plants over time when the leaves or roots are removed. <input type="checkbox"/> Observe the effect of putting cut white carnations or celery in coloured water. <input type="checkbox"/> Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. <input type="checkbox"/> Spot flowers, seeds, berries and fruits outside throughout the year. <input type="checkbox"/> Observe flowers carefully to identify the pollen. <input type="checkbox"/> Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. <input type="checkbox"/> Observe seeds being blown from the trees e.g. sycamore seeds. <input type="checkbox"/> Research different types of seed dispersal. <input type="checkbox"/> Classify seeds in a range of ways, including by how they are dispersed. <input type="checkbox"/> Create a new species of flowering plant. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can explain observations made during investigations <input type="checkbox"/> Can look at the features of seeds to decide on their method of dispersal <input type="checkbox"/> Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal

	Year	3	Topic	Animals, including humans
	<ul style="list-style-type: none"> <input type="checkbox"/> 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. <input type="checkbox"/> Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals, including humans) <input type="checkbox"/> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) <input type="checkbox"/> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans) <input type="checkbox"/> Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans) <input type="checkbox"/> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans) 	<ul style="list-style-type: none"> <input type="checkbox"/> Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) <input type="checkbox"/> Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans) <input type="checkbox"/> Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans) <input type="checkbox"/> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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>Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can name the nutrients found in food <input type="checkbox"/> Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients


Key vocabulary	
Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	<input type="checkbox"/> Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection <input type="checkbox"/> Can describe how muscles and joints help them to move
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> certain whole food groups like fats are 'bad' for you <input type="checkbox"/> certain specific foods, like cheese are also 'bad' for you <input type="checkbox"/> diet and fruit drinks are 'good' for you <input type="checkbox"/> snakes are similar to worms, so they must also be invertebrates <input type="checkbox"/> invertebrates have no form of skeleton. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Classify food in a range of ways. <input type="checkbox"/> Use food labels to explore the nutritional content of a range of food items. <input type="checkbox"/> Use secondary sources to find out the types of food that contain the different nutrients. <input type="checkbox"/> 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? <input type="checkbox"/> Plan a daily diet to contain a good balance of nutrients. <input type="checkbox"/> Explore the nutrients contained in fast food. <input type="checkbox"/> Use secondary sources to research the parts and functions of the skeleton. <input type="checkbox"/> Investigate patterns asking questions such as: <ul style="list-style-type: none"> ✦ Can people with longer legs run faster? ✦ Can people with bigger hands catch a ball better? <input type="checkbox"/> Compare, contrast and classify skeletons of different animals. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can classify food into those that are high or low in particular nutrients <input type="checkbox"/> Can answer their questions about nutrients in food, based on their gathered evidence <input type="checkbox"/> Can talk about the nutrient content of their daily plan <input type="checkbox"/> Use their data to look for patterns (or lack of them) when answering their enquiry question <input type="checkbox"/> Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons

	Year	3	Topic	Rocks
	<ul style="list-style-type: none"> <input type="checkbox"/> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. <input type="checkbox"/> Describe in simple terms how fossils are formed when things that have lived are trapped within rock. <input type="checkbox"/> Recognise that soils are made from rocks and organic matter. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) <input type="checkbox"/> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) <input type="checkbox"/> Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) <input type="checkbox"/> 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) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> The composition of the Earth. (KS3) <input type="checkbox"/> The structure of the Earth. (KS3) <input type="checkbox"/> The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can name some types of rock and give physical features of each <input type="checkbox"/> Can explain how a fossil is formed <input type="checkbox"/> Can explain that soils are made from rocks and also contain living/dead matter


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	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> rocks are all hard in nature <input type="checkbox"/> rock-like, man-made substances such as concrete or brick are rocks <input type="checkbox"/> materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' <input type="checkbox"/> certain found artefacts, like old bits of pottery or coins, are fossils <input type="checkbox"/> a fossil is an actual piece of the extinct animal or plant <input type="checkbox"/> soil and compost are the same thing. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Observe rocks closely. <input type="checkbox"/> Classify rocks in a range of ways, based on their appearance. <input type="checkbox"/> Devise a test to investigate the hardness of a range of rocks. <input type="checkbox"/> Devise a test to investigate how much water different rocks absorb. <input type="checkbox"/> Observe how rocks change over time e.g. gravestones or old building. <input type="checkbox"/> Research using secondary sources how fossils are formed. <input type="checkbox"/> Observe soils closely. <input type="checkbox"/> Classify soils in a range of ways based on their appearance. <input type="checkbox"/> Devise a test to investigate the water retention of soils. <input type="checkbox"/> Observe how soil can be separated through sedimentation. <input type="checkbox"/> Research the work of Mary Anning. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can classify rocks in a range of different ways, using appropriate vocabulary <input type="checkbox"/> Can devise tests to explore the properties of rocks and use data to rank the rocks <input type="checkbox"/> Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily <input type="checkbox"/> Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. <input type="checkbox"/> Can identify plant/animal matter and rocks in samples of soil <input type="checkbox"/> Can devise a test to explore the water retention of soils

	Year	3	Topic	Light
<ul style="list-style-type: none"> <input type="checkbox"/> Recognise that they need light in order to see things, and that dark is the absence of light. <input type="checkbox"/> Notice that light is reflected from surfaces. <input type="checkbox"/> Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. <input type="checkbox"/> Recognise that shadows are formed when the light from a light source is blocked by an opaque object. <input type="checkbox"/> Find patterns in the way that the size of shadows change. 				

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials) 	<ul style="list-style-type: none"> <input type="checkbox"/> Recognise that light appears to travel in straight lines. (Y6 - Light) <input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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.</p> <p>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"> <input type="checkbox"/> Can describe how we see objects in light and can describe dark as the absence of light <input type="checkbox"/> Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses <input type="checkbox"/> Can define transparent, translucent and opaque <input type="checkbox"/> Can describe how shadows are formed

Key vocabulary	
Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> we can still see even where there is an absence of any light <input type="checkbox"/> our eyes 'get used to' the dark <input type="checkbox"/> the moon and reflective surfaces are light sources <input type="checkbox"/> a transparent object is a light source <input type="checkbox"/> shadows contain details of the object, such as facial features on their own shadow <input type="checkbox"/> shadows result from objects giving off darkness. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Explore how different objects are more or less visible in different levels of lighting. <input type="checkbox"/> Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. <input type="checkbox"/> Explore how shadows vary as the distance between a light source and an object or surface is changed. <input type="checkbox"/> Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. <input type="checkbox"/> Choose suitable materials to make shadow puppets. <input type="checkbox"/> Create artwork using shadows. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change <input type="checkbox"/> Can clearly explain, giving examples, that objects are not visible in complete darkness <input type="checkbox"/> Can describe and demonstrate how shadows are formed by blocking light <input type="checkbox"/> Can describe, demonstrate and make predictions about patterns in how shadows vary


	Year	3	Topic	Forces and magnets
	<ul style="list-style-type: none"> <input type="checkbox"/> Compare how things move on different surfaces. <input type="checkbox"/> Notice that some forces need contact between two objects, but magnetic forces can act at a distance. <input type="checkbox"/> Observe how magnets attract or repel each other and attract some materials and not others. <input type="checkbox"/> 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. <input type="checkbox"/> Describe magnets as having two poles. <input type="checkbox"/> Predict whether two magnets will attract or repel each other, depending on which poles are facing. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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) 	<ul style="list-style-type: none"> <input type="checkbox"/> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) <input type="checkbox"/> Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces) <input type="checkbox"/> Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) <input type="checkbox"/> Magnetic fields by plotting with compass, representation by field lines. (KS3) <input type="checkbox"/> Earth's magnetism, compass and navigation. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can give examples of forces in everyday life <input type="checkbox"/> Can give examples of objects moving differently on different surfaces <input type="checkbox"/> Can name a range of types of magnets and show how the poles attract and repel <input type="checkbox"/> Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets

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.	
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	
Common misconceptions	
Some children may think:	
<input type="checkbox"/> the bigger the magnet the stronger it is <input type="checkbox"/> all metals are magnetic.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. <input type="checkbox"/> Explore what materials are attracted to a magnet. <input type="checkbox"/> Classify materials according to whether they are magnetic. <input type="checkbox"/> Explore the way that magnets behave in relation to each other. <input type="checkbox"/> Use a marked magnet to find the unmarked poles on other types of magnets. <input type="checkbox"/> Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. <input type="checkbox"/> Devise an investigation to test the strength of magnets.	<input type="checkbox"/> Can use their results to describe how objects move on different surfaces <input type="checkbox"/> Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface <input type="checkbox"/> Can use classification evidence to identify that some metals, but not all, are magnetic <input type="checkbox"/> Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles <input type="checkbox"/> Can use test data to rank magnets


Knowledge Statements Y4

	Year	4	Topic	Living things and their habitats
	<ul style="list-style-type: none"> <input type="checkbox"/> Recognise that living things can be grouped in a variety of ways. <input type="checkbox"/> Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. <input type="checkbox"/> Recognise that environments can change and that this can sometimes pose dangers to living things. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) <input type="checkbox"/> Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) <input type="checkbox"/> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) <input type="checkbox"/> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) <input type="checkbox"/> Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) 	<ul style="list-style-type: none"> <input type="checkbox"/> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) <input type="checkbox"/> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) <input type="checkbox"/> 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) <input type="checkbox"/> Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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"> <input type="checkbox"/> Can name living things living in a range of habitats, giving the key features that helped them to identify them <input type="checkbox"/> Can give examples of how an environment may change both naturally and due to human impact

Key vocabulary	
Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain <input type="checkbox"/> there is always plenty of food for wild animals <input type="checkbox"/> animals are only land-living creatures <input type="checkbox"/> animals and plants can adapt to their habitats, however they change <input type="checkbox"/> all changes to habitats are negative. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Observe plants and animals in different habitats throughout the year. <input type="checkbox"/> Compare and contrast the living things observed. <input type="checkbox"/> Use classification keys to name unknown living things. <input type="checkbox"/> Classify living things found in different habitats based on their features. <input type="checkbox"/> Create a simple identification key based on observable features. <input type="checkbox"/> Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. <input type="checkbox"/> Use secondary sources to find out about how environments may naturally change. <input type="checkbox"/> Use secondary sources to find out about human impact, both positive and negative, on environments. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.) <input type="checkbox"/> Can use classification keys to identify unknown plants and animals <input type="checkbox"/> Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter

	Year	4	Topic	Animals, including humans
	<ul style="list-style-type: none"> <input type="checkbox"/> Describe the simple functions of the basic parts of the digestive system in humans. <input type="checkbox"/> Identify the different types of teeth in humans and their simple functions. <input type="checkbox"/> Construct and interpret a variety of food chains, identifying producers, predators and prey. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) <input type="checkbox"/> Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans) <input type="checkbox"/> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans) <input type="checkbox"/> 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. (Y3 - Animals, including humans) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans) <input type="checkbox"/> Describe the ways in which nutrients and water are transported within animals, including humans. (Y6 - Animals, including humans)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<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.</p> <p>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> <p>Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can sequence the main parts of the digestive system <input type="checkbox"/> Can draw the main parts of the digestive system onto a human outline <input type="checkbox"/> Can describe what happens in each part of the digestive system <input type="checkbox"/> Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for <input type="checkbox"/> Can name producers, predators and prey within a habitat

Living things can be classified as producers, predators and prey according to their place in the food chain.	<input type="checkbox"/> Can construct food chains
Key vocabulary	
Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	
Common misconceptions	
Some children may think: <input type="checkbox"/> arrows in a food chains mean ‘eats’ <input type="checkbox"/> the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain <input type="checkbox"/> there is always plenty of food for wild animals <input type="checkbox"/> your stomach is where your belly button is <input type="checkbox"/> food is digested only in the stomach <input type="checkbox"/> when you have a meal, your food goes down one tube and your drink down another <input type="checkbox"/> the food you eat becomes “poo” and the drink becomes “wee”.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Research the function of the parts of the digestive system. <input type="checkbox"/> Create a model of the digestive system using household objects. <input type="checkbox"/> Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). <input type="checkbox"/> Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. <input type="checkbox"/> Use food chains to identify producers, predators and prey within a habitat. <input type="checkbox"/> Use secondary sources to identify animals in a habitat and find out what they eat.	<input type="checkbox"/> Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part <input type="checkbox"/> Can record the teeth in their mouth (make a dental record) <input type="checkbox"/> Can explain the role of the different types of teeth <input type="checkbox"/> Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores <input type="checkbox"/> Can create food chains based on research



Year	4	Topic	States of matter
<input type="checkbox"/> Compare and group materials together, according to whether they are solids, liquids or gases. <input type="checkbox"/> 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). <input type="checkbox"/> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.			

Prior learning	Future learning
<input type="checkbox"/> Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) <input type="checkbox"/> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) <input type="checkbox"/> Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) <input type="checkbox"/> 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) <input type="checkbox"/> 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)	<input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> Demonstrate that dissolving, mixing and changes of state are reversible changes. (Y5 - Properties and changes of materials) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning

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 temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. 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.

Key vocabulary

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

Possible evidence

- ☐ Can create a concept map, including arrows linking the key vocabulary
- ☐ Can name properties of solids, liquids and gases
- ☐ Can give everyday examples of melting and freezing
- ☐ Can give everyday examples of evaporation and condensation
- ☐ Can describe the water cycle

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)

- ☐ clouds are made of water vapour or steam
- ☐ the substance on windows etc. is condensation rather than water
- ☐ the changing states of water (illustrated by the water cycle) are irreversible
- ☐ evaporating or boiling water makes it vanish
- ☐ evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Observe closely and classify a range of solids. Observe closely and classify a range of liquids. <input type="checkbox"/> Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. <input type="checkbox"/> Classify materials according to whether they are solids, liquids and gases. <input type="checkbox"/> Observe a range of materials melting e.g. ice, chocolate, butter. <input type="checkbox"/> Investigate how to melt ice more quickly. <input type="checkbox"/> Observe the changes when making rocky road cakes or ice-cream. <input type="checkbox"/> Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate. <input type="checkbox"/> Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. <input type="checkbox"/> Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). <input type="checkbox"/> Observe water evaporating and condensing e.g. on cups of icy water and hot water. <input type="checkbox"/> Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. <input type="checkbox"/> Use secondary sources to find out about the water cycle. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can give reasons to justify why something is a solid liquid or gas <input type="checkbox"/> Can give examples of things that melt/freeze and how their melting points vary <input type="checkbox"/> From their observations, can give the melting points of some materials <input type="checkbox"/> Using their data, can explain what affects how quickly a solid melts <input type="checkbox"/> Can measure temperatures using a thermometer <input type="checkbox"/> Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup <input type="checkbox"/> From their data, can explain how to speed up or slow down evaporation <input type="checkbox"/> Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet

	Year	4	Topic	Sound
	<ul style="list-style-type: none"> <input type="checkbox"/> Identify how sounds are made, associating some of them with something vibrating. <input type="checkbox"/> Recognise that vibrations from sounds travel through a medium to the ear. <input type="checkbox"/> Find patterns between the pitch of a sound and features of the object that produced it. <input type="checkbox"/> Find patterns between the volume of a sound and the strength of the vibrations that produced it. <input type="checkbox"/> Recognise that sounds get fainter as the distance from the sound source increases. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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) 	<ul style="list-style-type: none"> <input type="checkbox"/> Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3) <input type="checkbox"/> Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3) <input type="checkbox"/> Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3) <input type="checkbox"/> 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) <input type="checkbox"/> Auditory range of humans and animals. (KS3) <input type="checkbox"/> Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3) <input type="checkbox"/> Waves transferring information for conversion to electrical signals by microphone. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning

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.

Key vocabulary

Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

Possible evidence

- ☐ Can name sound sources and state that sounds are produced by the vibration of the object
- ☐ Can state that sounds travel through different mediums such as air, water, metal
- ☐ Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it
- ☐ Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder
- ☐ Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases

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.

Apply knowledge in familiar related contexts, including a range of enquiries


Activities

- ☐ 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.

Possible evidence

- ☐ Can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear
- ☐ Can demonstrate how to increase or decrease pitch and volume using musical instruments or other objects
- ☐ Can use data to identify patterns in pitch and volume

	<input type="checkbox"/> Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium
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	Year	4	Topic	Electricity
	<ul style="list-style-type: none"> <input type="checkbox"/> Identify common appliances that run on electricity. <input type="checkbox"/> Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. <input type="checkbox"/> 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. <input type="checkbox"/> Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. <input type="checkbox"/> Recognise some common conductors and insulators, and associate metals with being good conductors. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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. (Early Learning Goal) 	<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> Use recognised symbols when representing a simple circuit in a diagram. (Y6 - Electricity)


WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<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.</p> <p>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"> <input type="checkbox"/> Can name the components in a circuit <input type="checkbox"/> Can make electric circuits <input type="checkbox"/> Can control a circuit using a switch <input type="checkbox"/> Can name some metals that are conductors <input type="checkbox"/> Can name materials that are insulators

Key vocabulary	
<p>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</p> <p>N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> electricity flows to bulbs, not through them <input type="checkbox"/> electricity flows out of both ends of a battery <input type="checkbox"/> electricity works by simply coming out of one end of a battery into the component. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Construct a range of circuits. <input type="checkbox"/> Explore which materials can be used instead of wires to make a circuit. <input type="checkbox"/> Classify the materials that were suitable/not suitable for wires. <input type="checkbox"/> Explore how to connect a range of different switches and investigate how they function in different ways. <input type="checkbox"/> Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm. <input type="checkbox"/> Apply their knowledge of conductors and insulators to design and make different types of switch. <input type="checkbox"/> Make circuits that can be controlled as part of a DT project. <p>N.B. Children should be given one component at a time to add to circuits.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can communicate structures of circuits using drawings which show how the components are connected <input type="checkbox"/> Use classification evidence to identify that metals are good conductors and non-metals are insulators <input type="checkbox"/> Can incorporate a switch into a circuit to turn it on and off <input type="checkbox"/> Can connect a range of different switches identifying the parts that are insulators and conductors <input type="checkbox"/> Can add a circuit with a switch to a DT project and can demonstrate how it works <input type="checkbox"/> Can give reasons for choice of materials for making different parts of a switch <input type="checkbox"/> Can describe how their switch works

Knowledge Statements Y5

	Year	5	Topic	Living things and their habitats
	<input type="checkbox"/> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. <input type="checkbox"/> Describe the life process of reproduction in some plants and animals.			


Prior learning	Future learning
<input type="checkbox"/> Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) <input type="checkbox"/> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)	<input type="checkbox"/> Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3) <input type="checkbox"/> 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)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.</p> <p>Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p>	<input type="checkbox"/> Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles <input type="checkbox"/> Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways


Key vocabulary	
Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> all plants start out as seeds <input type="checkbox"/> all plants have flowers <input type="checkbox"/> plants that grow from bulbs do not have seeds <input type="checkbox"/> only birds lay eggs. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. <input type="checkbox"/> Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. <input type="checkbox"/> Look for patterns between the size of an animal and its expected life span. <input type="checkbox"/> Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. <input type="checkbox"/> Take cuttings from a range of plants e.g. African violet, mint. <input type="checkbox"/> Plant bulbs and then harvest to see how they multiply. <input type="checkbox"/> Use secondary sources to find out about pollination. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can present their understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game <input type="checkbox"/> Can identify patterns in life cycles <input type="checkbox"/> Can compare two or more animal life cycles they have studied <input type="checkbox"/> Can explain how a range of plants reproduce asexually

	Year	5	Topic	Animals, including humans
<input type="checkbox"/> Describe the changes as humans develop to old age.				

Prior learning	Future learning
<input type="checkbox"/> Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)	<input type="checkbox"/> Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.</p> <p>This needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found below:</p> <ul style="list-style-type: none"> <input type="checkbox"/> statutory guidance on Physical health and mental wellbeing (primary and secondary). <p>Other useful guidance includes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Joint briefing on teaching about puberty in KS2 from PHSE Association and Association for Science Education <input type="checkbox"/> Briefing on humans development and reproduction in the Primary Curriculum from PHSE Association and Association for Science Education. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can explain the changes that takes place in boys and girls during puberty <input type="checkbox"/> Can explain how a baby changes physically as it grows, and also what it is able to do

Key vocabulary	
Puberty – the vocabulary to describe sexual characteristics	
Common misconceptions	
Some children may think: <input type="checkbox"/> a baby grows in a mother's tummy <input type="checkbox"/> a baby is “made”.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
This unit is likely to be taught through direct instruction due to its sensitive nature, although children can carry out a research enquiry by asking an expert e.g. school nurse to provide answers to questions that have been filtered by the teacher.	<input type="checkbox"/> Can present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to ‘problem page questions’

	Year	5	Topic	Properties and changes of materials
	<ul style="list-style-type: none"> <input type="checkbox"/> 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. <input type="checkbox"/> Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. <input type="checkbox"/> Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. <input type="checkbox"/> Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. <input type="checkbox"/> Demonstrate that dissolving, mixing and changes of state are reversible changes. <input type="checkbox"/> 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. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> 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) <input type="checkbox"/> 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) <input type="checkbox"/> 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. (Y3 - Forces and magnets) <input type="checkbox"/> Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter) <input type="checkbox"/> 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). (Y4 - States of matter) <input type="checkbox"/> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter) 	<ul style="list-style-type: none"> <input type="checkbox"/> Chemical reactions as the rearrangement of atoms. (KS3) <input type="checkbox"/> Representing chemical reactions using formulae and using equations. (KS3) <input type="checkbox"/> Combustion, thermal decomposition, oxidation and displacement reactions. (KS3) <input type="checkbox"/> Defining acids and alkalis in terms of neutralisation reactions. (KS3) <input type="checkbox"/> The pH scale for measuring acidity/alkalinity; and indicators. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.</p> <p>Mixtures can be separated by filtering, sieving and evaporation.</p> <p>Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings <input type="checkbox"/> Can explain what dissolving means, giving examples <input type="checkbox"/> Can name equipment used for filtering and sieving <input type="checkbox"/> Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving <input type="checkbox"/> Can describe some simple reversible and non-reversible changes to materials, giving examples
Key vocabulary	
Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	

Common misconceptions

Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.


Some children may think:

- ☐ thermal insulators keep cold in or out
- ☐ thermal insulators warm things up
- ☐ solids dissolved in liquids have vanished and so you cannot get them back
- ☐ lit candles only melt, which is a reversible change.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. <input type="checkbox"/> Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. <input type="checkbox"/> Investigate rates of dissolving by carrying out comparative and fair test. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can create a chart or table grouping/comparing everyday materials by different properties <input type="checkbox"/> Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose

<ul style="list-style-type: none"> <input type="checkbox"/> Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. <input type="checkbox"/> Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. <input type="checkbox"/> Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? <input type="checkbox"/> Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton). 	<ul style="list-style-type: none"> <input type="checkbox"/> Can group solids based on their observations when mixing them with water <input type="checkbox"/> Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water <input type="checkbox"/> Can explain the results from their investigations
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	Year	5	Topic	Earth and space
	<input type="checkbox"/> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. <input type="checkbox"/> Describe the movement of the Moon relative to the Earth. <input type="checkbox"/> Describe the Sun, Earth and Moon as approximately spherical bodies. <input type="checkbox"/> Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.			

Prior learning	Future learning
<input type="checkbox"/> Observe changes across the four seasons. (Y1 - Seasonal changes) <input type="checkbox"/> Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)	<input type="checkbox"/> Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). (KS3) <input type="checkbox"/> Our Sun as a star, other stars in our galaxy, other galaxies. (KS3) <input type="checkbox"/> The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3) <input type="checkbox"/> The light year as a unit of astronomical distance. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes $365\frac{1}{4}$ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</p>	<input type="checkbox"/> Can create a voice over for a video clip or animation <input type="checkbox"/> Can show, using diagrams, the movement of the Earth and Moon <input type="checkbox"/> Can explain the movement of the Earth and Moon <input type="checkbox"/> Can show using diagrams the rotation of the Earth and how this causes day and night <input type="checkbox"/> Can explain what causes day and night
Key vocabulary	
Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets	

Common misconceptions

Some children may think:

- ☐ the Earth is flat
- ☐ the Sun is a planet
- ☐ the Sun rotates around the Earth
- ☐ the Sun moves across the sky during the day
- ☐ the Sun rises in the morning and sets in the evening
- ☐ the Moon appears only at night
- ☐ night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.


Apply knowledge in familiar related contexts, including a range of enquiries

Activities

- ☐ Use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and the Moon around the Earth.
- ☐ Use secondary sources to help make a model to show why day and night occur.
- ☐ Make first-hand observations of how shadows caused by the Sun change through the day.
- ☐ Make a sundial.
- ☐ Research time zones.
- ☐ Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel.

Possible evidence

- ☐ Can use the model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth
- ☐ Can demonstrate and explain verbally how day and night occur
- ☐ Can explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model
- ☐ Can explain how a sundial works
- ☐ Can explain verbally, using a model, why we have time zones
- ☐ Can describe the arguments and evidence used by scientists in the past


	Year	5	Topic	Forces
	<ul style="list-style-type: none"> <input type="checkbox"/> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. <input type="checkbox"/> Identify the effects of air resistance, water resistance and friction that act between moving surfaces. <input type="checkbox"/> Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Compare how things move on different surfaces. (Y3 - Forces and magnets) <input type="checkbox"/> Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) <input type="checkbox"/> Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets) <input type="checkbox"/> 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. (Y3 - Forces and magnets) <input type="checkbox"/> Describe magnets as having two poles. (Y3 - Forces and magnets) <input type="checkbox"/> Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets) 	<ul style="list-style-type: none"> <input type="checkbox"/> Forces as pushes or pulls, arising from the interaction between two objects. (KS3) <input type="checkbox"/> Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3) <input type="checkbox"/> Moment as the turning effect of a force. (KS3) <input type="checkbox"/> Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3) <input type="checkbox"/> Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.</p> <p>Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object.</p> <p>A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can demonstrate the effect of gravity acting on an unsupported object <input type="checkbox"/> Can give examples of friction, water resistance and air resistance <input type="checkbox"/> Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance <input type="checkbox"/> Can demonstrate how pulleys, levers and gears work

distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.	
Key vocabulary	
Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> the heavier the object the faster it falls, because it has more gravity acting on it <input type="checkbox"/> forces always act in pairs which are equal and opposite <input type="checkbox"/> smooth surfaces have no friction <input type="checkbox"/> objects always travel better on smooth surfaces <input type="checkbox"/> a moving object has a force which is pushing it forwards and it stops when the pushing force wears out <input type="checkbox"/> a non-moving object has no forces acting on it <input type="checkbox"/> heavy objects sink and light objects float. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. <input type="checkbox"/> Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. <input type="checkbox"/> Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. <input type="checkbox"/> Explore how levers, pulleys and gears work. <input type="checkbox"/> Make a product that involves a lever, pulley or gear. <input type="checkbox"/> Create a timer that uses gravity to move a ball. <input type="checkbox"/> Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface the particles in the water, air or on the surface slow it down <input type="checkbox"/> Can demonstrate clearly the effects of using levers, pulleys and gears


Knowledge Statements Y6

	Year	6	Topic	Living things and their habitats
<ul style="list-style-type: none"> □ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. □ Give reasons for classifying plants and animals based on specific characteristics. 				

Prior learning	Future learning
<ul style="list-style-type: none"> □ Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) □ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) □ 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) 	<ul style="list-style-type: none"> □ Differences between species. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot.</p> <p>Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.</p> <p>Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.</p>	<ul style="list-style-type: none"> □ Can give examples of animals in the five vertebrate groups and some of the invertebrate groups □ Can give the key characteristics of the five vertebrate groups and some invertebrate groups □ Can compare the characteristics of animals in different groups


Key vocabulary	<input type="checkbox"/> Can give examples of flowering and non-flowering plants
Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering	
Common misconceptions	
Some children may think: <input type="checkbox"/> all micro-organisms are harmful <input type="checkbox"/> mushrooms are plants.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. <input type="checkbox"/> Use first-hand observation to identify characteristics shared by the animals in a group. <input type="checkbox"/> Use secondary sources to research the characteristics of animals that belong to a group. <input type="checkbox"/> Use information about the characteristics of an unknown animal or plant to assign it to a group. <input type="checkbox"/> Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys. <input type="checkbox"/> Create an imaginary animal which has features from one or more groups.	<input type="checkbox"/> Can use classification materials to identify unknown plants and animals <input type="checkbox"/> Can create classification keys for plants and animals <input type="checkbox"/> Can give a number of characteristics that explain why an animal belongs to a particular group

	Year	6	Topic	Animals, including humans
	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. <input type="checkbox"/> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. <input type="checkbox"/> Describe the ways in which nutrients and water are transported within animals, including humans. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans) <input type="checkbox"/> 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. (Y3 - Animals, including humans) <input type="checkbox"/> Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) <input type="checkbox"/> Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans) 	<ul style="list-style-type: none"> <input type="checkbox"/> The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. (KS3) <input type="checkbox"/> The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. (KS3) <input type="checkbox"/> The structure and functions of the gas exchange system in humans, including adaptations to function. (KS3) <input type="checkbox"/> The mechanism of breathing to move air in and out of the lungs. (KS3) <input type="checkbox"/> The impact of exercise, asthma and smoking on the human gas exchange system. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.</p> <p>Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. This content is also included in PSHE. The new statutory requirements for relationships and health education can be found below:</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do <input type="checkbox"/> Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart


<input type="checkbox"/> statutory guidance on Physical health and mental wellbeing (primary and secondary).	
Key vocabulary	
Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> your heart is on the left side of your chest <input type="checkbox"/> the heart makes blood <input type="checkbox"/> the blood travels in one loop from the heart to the lungs and around the body <input type="checkbox"/> when we exercise, our heart beats faster to work the muscles more <input type="checkbox"/> some blood in our bodies is blue and some blood is red <input type="checkbox"/> we just eat food for energy <input type="checkbox"/> all fat is bad for you <input type="checkbox"/> all dairy is good for you <input type="checkbox"/> protein is good for you, so you can eat as much as you want <input type="checkbox"/> foods only contain fat if you can see it <input type="checkbox"/> all drugs are bad for you. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> <input type="checkbox"/> Create a role play model for the circulatory system. <input type="checkbox"/> Carry out a range of pulse rate investigations: <ul style="list-style-type: none"> ✦ fair test – effect of different activities on my pulse rate ✦ pattern seeking – exploring which groups of people may have higher or lower resting pulse rates ✦ observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) ✦ pattern seeking – exploring recovery rate for different groups of people. <input type="checkbox"/> Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources. 	<ul style="list-style-type: none"> <input type="checkbox"/> Use the role play model to explain the main parts of the circulatory system and their role <input type="checkbox"/> Can use subject knowledge about the heart whilst writing conclusions for investigations <input type="checkbox"/> Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body <input type="checkbox"/> Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body

	Year	6	Topic	Evolution and inheritance
	<ul style="list-style-type: none"> <input type="checkbox"/> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. <input type="checkbox"/> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. <input type="checkbox"/> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			

Prior learning	Future learning
<ul style="list-style-type: none"> <input type="checkbox"/> Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats) <input type="checkbox"/> Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) <input type="checkbox"/> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) <input type="checkbox"/> Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) <input type="checkbox"/> Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) <input type="checkbox"/> Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5) 	<ul style="list-style-type: none"> <input type="checkbox"/> Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3) <input type="checkbox"/> A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3) <input type="checkbox"/> The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3) <input type="checkbox"/> Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.</p> <p>Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Can explain the process of evolution <input type="checkbox"/> Can give examples of how plants and animals are suited to an environment <input type="checkbox"/> Can give examples of how an animal or plant has evolved over time e.g. penguin, peppered moth

<p>characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.</p> <p>Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Give examples of living things that lived millions of years ago and the fossil evidence we have to support this <input type="checkbox"/> Can give examples of fossil evidence that can be used to support the theory of evolution
<p style="text-align: center;">Key vocabulary</p>	
<p>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</p>	
<p style="text-align: center;">Common misconceptions</p>	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life <input type="checkbox"/> offspring most resemble their parents of the same sex, so that sons look like fathers <input type="checkbox"/> all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited <input type="checkbox"/> cavemen and dinosaurs were alive at the same time. 	
<p style="text-align: center;">Apply knowledge in familiar related contexts, including a range of enquiries</p>	
<p style="text-align: center;">Activities</p>	<p style="text-align: center;">Possible evidence</p>
<ul style="list-style-type: none"> <input type="checkbox"/> Design a new plant or animal to live in a particular habitat. <input type="checkbox"/> Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity. <input type="checkbox"/> Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution. <input type="checkbox"/> Make observations of fossils to identify living things that lived on Earth millions of years ago. <input type="checkbox"/> Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs. <input type="checkbox"/> Compare the ideas of Charles Darwin and Alfred Wallace on evolution. <input type="checkbox"/> Research the work of Mary Anning and how this provided evidence of evolution. 	<ul style="list-style-type: none"> <input type="checkbox"/> Can identify characteristics that will make a plant or animal suited or not suited to a particular habitat <input type="checkbox"/> Can link the patterns seen in the model to real examples <input type="checkbox"/> Can explain why the dominant colour of the peppered moth changed over a very short period of time

	Year	6	Topic	Light
	<ul style="list-style-type: none"> □ Recognise that light appears to travel in straight lines. □ Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. □ Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. □ Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 			


Prior learning	Future learning
<ul style="list-style-type: none"> □ Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light) □ Notice that light is reflected from surfaces. (Y3 - Light) □ Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) □ Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light) □ Find patterns in the way that the size of shadows change. (Y3 - Light) □ 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) 	<ul style="list-style-type: none"> □ The similarities and differences between light waves and waves in matter. (KS3) □ Light waves travelling through a vacuum; speed of light. (KS3) □ The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3) □ Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. (KS3) □ Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3) □ Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen.</p> <p>Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.</p>	<ul style="list-style-type: none"> □ Can describe, with diagrams or models as appropriate, how light travels in straight lines either from sources or reflected from other objects into our eyes □ Can describe, with diagrams or models as appropriate, how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape

Key vocabulary	
As for Year 3 - Light, plus straight lines, light rays	
Common misconceptions	
Some children may think:	
<input type="checkbox"/> we see objects because light travels from our eyes to the object.	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<input type="checkbox"/> Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. <input type="checkbox"/> Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets.	<input type="checkbox"/> Can explain how evidence from enquiries shows that light travels in straight lines <input type="checkbox"/> Can predict and explain, with diagrams or models as appropriate, how the path of light rays can be directed by reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope <input type="checkbox"/> Can predict and explain, with diagrams or models as appropriate, how the shape of shadows can be varied

	Year	6	Topic	Electricity
	<ul style="list-style-type: none"> □ Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. □ Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. □ Use recognised symbols when representing a simple circuit in a diagram. 			

Prior learning	Future learning
<ul style="list-style-type: none"> □ Identify common appliances that run on electricity. (Y4 - Electricity) □ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4 - Electricity) □ 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. (Y4 - Electricity) □ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4 - Electricity) □ Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity) 	<ul style="list-style-type: none"> □ Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3) □ Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3) □ Differences in resistance between conducting and insulating components (quantitative). (KS3) □ Static electricity. (KS3)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
<p>Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.</p> <p>You can use recognised circuit symbols to draw simple circuit diagrams.</p>	<ul style="list-style-type: none"> □ Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages □ Can draw circuit diagrams of a range of simple series circuits using recognised symbols

<p style="text-align: center;">Key vocabulary</p> <p>Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage</p> <p>N.B. Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> <input type="checkbox"/> larger-sized batteries make bulbs brighter <input type="checkbox"/> a complete circuit uses up electricity <input type="checkbox"/> components in a circuit that are closer to the battery get more electricity. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
<p style="text-align: center;">Activities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower. <input type="checkbox"/> Make circuits to solve particular problems, such as a quiet and a loud burglar alarm. <input type="checkbox"/> Carry out fair tests exploring changes in circuits. <input type="checkbox"/> Make circuits that can be controlled as part of a DT project. 	<p style="text-align: center;">Possible evidence</p> <ul style="list-style-type: none"> <input type="checkbox"/> Can incorporate a switch into a circuit to turn it on and off <input type="checkbox"/> Can change cells and components in a circuit to achieve a specific effect <input type="checkbox"/> Can communicate structures of circuits using circuit diagrams with recognised symbols <input type="checkbox"/> Can devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test <input type="checkbox"/> Can predict results and answer questions by drawing on evidence gathered