



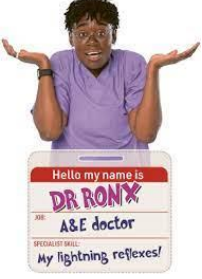





Science Scheme of Work



Early Years

Overview of Topics

	Autumn		Spring		Summer	
	Cycle 1	Cycle 2	Cycle 1	Cycle 2	Cycle 1	Cycle 2
Topic	Into the Woods	Food and Festivals	All About Me	Imaginary Worlds	In the Garden	About Town
Areas Covered	Plants Habitats Animals Materials	Plants Materials Habitats	Animals including Humans	Materials	Plants Animals Habitats	Materials Habitats
Seasons						
Curriculum Enrichment	<ul style="list-style-type: none"> • Forest School • Garden Classroom • Highgate Woods • Local Park 	<ul style="list-style-type: none"> • Forest School • Garden Classroom • Market/Shop visit • Cooking workshop 	<ul style="list-style-type: none"> • Forest School • City Farm • Doctor/Nurse/Midwife visit 	<ul style="list-style-type: none"> • Forest School • Garden Classroom 	<ul style="list-style-type: none"> • Forest School • Hampstead Heath • Pond Dipping • Local Park 	<ul style="list-style-type: none"> • Forest School • Local Area walk • London zoo • Garden Classroom
Inspirational Scientists	<p><i>Ben Williams Tree Surgeon</i></p> 	<p><i>Adam Henson Farmer</i></p> 	<p><i>Dr Ronx Doctor</i></p> 	<p><i>Dr Emma Nicholls Palaeontologist</i></p> 	<p><i>Tayshan Hayden-Smith Gardener</i></p> 	<p><i>Roma Agrawal Engineer</i></p> 

Linked Topics:	Year	EYFS	Topic	Plants
Into the Woods				
Food and Festivals				
In the Garden				

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Name some plants and identify where they might be found growing,</p> <p>Use our senses to find out about the plants and other natural objects around us</p> <p>Identify similarities and differences between plants and other natural objects and sort into groups</p> <p>To observe plants and other natural objects closely and to describe them using simple scientific language.</p> <p>Explore through practical activities and books the life cycle of some plants.</p> <p>Understand some foods come from plants.</p> <p>Identify changes to plants through the seasons, as they grow and when they are cooked.</p> <p>Use our senses as appropriate (smell, touch, taste, sight) to identify plants e.g. flowers, herbs, fruit and vegetables</p> <p>Know some plants are not safe to eat and identify they should ask an adult if something is safe to eat.</p>	<ul style="list-style-type: none"> • Can identify some plants that grow in different habitats e.g. a garden, in woodland • Can make simple comparisons between different plants • Can make simple observations and drawings of plants during first hand experiences of different habitats • Can identify some plants using books and information charts • Can talk about different plants that they come across in books, pictures and stories and make some simple comparisons. • Can observe changes to plants e.g. trees develop buds, leaves change colour, flowers bloom in spring • Can explain in simple terms e.g. ordering pictures simple life cycles of familiar plants from practical growing experiences e.g. growing beans or sunflowers • Can explain in simple terms some things plants need to grow • Can understand that some food they eat comes from plants • Can recognise and name some fruits and vegetables • Can identify some features of different fruit and vegetables e.g. they have a single seed or lots of seeds. • Can identify simple changes that happen to plants when they cook with them e.g. they become softer • Can use their senses appropriately to explore plants and describe them • Can understand that not all plants are safe to eat

Key vocabulary

Plants – tree, flower, bush, bud, stem, leaf

Trees - oak, fir, beech, willow, horse chestnut, pear, lilac

Flowers – bluebell, daffodil, crocus, snowdrop

Fruit – pear, plum, apple, orange, strawberry, cherry, grape, cucumber, tomato, melon, banana

Vegetables – bean, squash, pumpkin, potato, carrot, broccoli, turnip

Natural objects - leaf/leaves, bark, trunk, twig, stick, seeds, nuts, acorn, conker, pine cone, berries, stones, soil, mud

Growing – rain, sun, change, grow

Senses - touch, smell, sight

Common misconceptions

Some children may think:

- Vegetables and fruit are the same thing
- Trees are not plants
- All natural objects are plants

Topic: Into the Woods
Term: Autumn Cycle 1

Learning Objectives

- Notices changes in and around the environment.
- Able to talk about and label the different seasons.
- Able to identify seasons through observation (Autumn/Winter focus).
- Comments on changes they notice in and around the environment – colours and patterns.
- Able to use books, media, pictures, ICT to identify different aspects in their natural environment.

Working Scientifically Skills

- Comments and asks questions about the environment.
- Observes, labels and identifies aspects of the natural environment.
- Makes marks, drawings and recordings of what they have observed.
- Uses ICT/non-fiction books to seek information.

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

Activities	Possible Evidence
<ul style="list-style-type: none"> • Visit to Highgate Woods, looking for signs of Autumn, seasonal changes, look at patterns, colours and textures in the environment. • Forest school sessions to build up interest, care and concern for the natural living world – leaf hunt, Autumn planting, patterns in nature, changes in nature. • Observational drawings of plants, natural objects, bugs etc. • Leaf printing and printing with other natural objects, bark rubbings etc. • Explore the different weathers – rain collectors (measuring), wind mills and kites, exploring shadows. • Use non-fiction books and technology to find out about the natural world (trees, plants etc). • Cook with seasonal foods and explore where they come from and promote healthy eating and lifestyles. • Using iPads/cameras to take photos and record changes in nature (Leaf app or Picture This app to identify trees and plants). 	<ul style="list-style-type: none"> • Observe children’s ability to label and identify aspects of their environment. • Children notice and are able to talk about changes in the environment. • Observations of children’s talk and language about the environment, in their learning environment, during trips, workshops and Forest School sessions.

Topic: Food and Festivals
Term: Autumn Cycle 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices changes in and around the environment. • Able to talk about and label the different seasons. • Able to identify seasons through observation (Autumn/Winter focus). • Comments on changes they notice in and around the environment – colours and patterns. • Identifies different fruits and vegetables and able to differentiate the two groups. • Can talk about where fruit and vegetables come from. • Able to use books, media, pictures, ICT to identify different aspects in their natural environment. 	<ul style="list-style-type: none"> • Observes, labels and identifies different fruits and vegetables/plants. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Identifies and labels simple plant life cycle/changes in plant life. • Uses ICT/non-fiction books to seek information.

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

Activities	Possible Evidence
<ul style="list-style-type: none"> • Explore seasonal changes – Autumn and Winter • Explore different weather and how this affects the environment (growing). • Cooking activities and workshops – fruit salad, focus on using harvested foods. Children talk about the foods and where they come from. • Sorting fruit and vegetable activities. 	<ul style="list-style-type: none"> • Observe children’s ability to label and identify fruits and vegetables. • Children notice and are able to talk about where fruits and vegetables come from, and how they grow. • Observations of children’s talk and language about the environment, in their learning environment, during trips, workshops and Forest School sessions.

<ul style="list-style-type: none"> Planting and harvesting foods – talking and learning about where fruit and vegetables come from, how they grow etc. Forest School – planting and looking at how foods grow. Looking at seasonal changes. 	<ul style="list-style-type: none"> Demonstrates understanding of simple plant life cycle.
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Topic: In the Garden	
Term: Summer Cycle 1	

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> Notices changes in and around the environment. Able to talk about and label the different seasons. Able to identify seasons through observation. Comments on changes they notice in and around the environment – colours and patterns, growth and decay etc. Identifies different fruits and vegetables and able to differentiate the two groups. Can talk about and demonstrate where fruit and vegetables come from, how they grow etc. Able to use books, media, pictures, ICT to identify different aspects in their natural environment, as well as to seek new information. 	<ul style="list-style-type: none"> Observes, labels and identifies different plants, fruits and vegetables. Makes marks, drawings and recordings of what they have observed. Sorts and differentiates. Plants and promotes growth of plant. Identifies and labels simple plant life cycle/changes in plant life. Uses ICT/non-fiction books to seek information.

Apply knowledge in familiar related contexts, including a range of enquiries	
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Activities	Possible Evidence
<ul style="list-style-type: none"> Visit to Hampstead Heath nature reserve. Garden classroom workshop. Growing plants and gardening – looking at the life cycle of a plant. Cooking with food they have grown Creating a sensory garden – designing and planting herbs, scented plants Growing beans, sunflowers or other fast growing plants. Investigating mould and decay. Investigating fruit and vegetables e.g. looking at different seeds, using senses to explore etc. Finding out where in the world fruit and vegetables come from Mud Pie Kitchen sensory activities. Look at a metre square in the school grounds and see what you can find. Record what they find where. Go on a sensory walk in the garden or park. What can they see, hear, touch, smell etc. Talk about what they heard, saw, smelt, felt and where. 	<ul style="list-style-type: none"> Observe children’s ability to label and identify aspects of their environment, trees, plants etc. Children notice and are able to talk about changes in the environment, and about where fruits and vegetables come from, and how they grow. Observations of children’s talk and language about the environment, plant life cycles, growing and harvesting, in their learning environment, during trips, workshops and Forest School sessions. Demonstrates understanding of simple plant life cycle.

Linked Units:	Year	EYFS	Topic	Animals, including humans
Autumn Cycle 1 - Into the Woods Spring Cycle 1- All About Me Autumn Cycle 2 - Food and Festivals Summer Cycle 1 - In the Garden				<ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Comments on how and where different animals live in the environment and around the world.</p> <p>Shows care and concern for animals and their environment.</p> <p>Shows some understanding of different animal groups (ocean, polar, woodland, nocturnal etc).</p> <p>Able to identify and label a simple animal life cycle, including human.</p> <p>Able to talk about changes in the body during exercise.</p> <p>Can label different parts of the body.</p> <p>Demonstrates understanding of the importance of living a healthy lifestyle.</p>	<ul style="list-style-type: none"> Can name a range of animals that can be found in a woodland habitat. Can describe some features of these named animals. Can identify where woodland animals live e.g. a nest, a burrow etc. Can label a simple animal life cycle (butterfly, frog, chick). Can talk about changes happening during a life cycle. Can label a simple human life cycle. Identifies and can talk about similarities and differences between animals, humans, babies, children, adults, elderly etc. Describes changes to the body when doing exercise. Can label different parts of the body and knows what their function is. Demonstrates understanding of the importance of living a healthy lifestyle.
Key vocabulary	
<p>Life cycle – hatch, grow, cycle, transform, change, born/birth, death/decay</p> <p>Body – breathing, heart, exercise, healthy, lifestyle</p> <p>Different body parts – facial features, leg, arm, knee, etc.</p> <p>Animals/groups – ocean, rainforest, polar, desert, woodland, nocturnal etc.</p>	

Common misconceptions

- Some children may think:
- Humans are not animals
 - All animals live in the same way

Topic: Into the Woods
Term: Autumn Cycle 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices changes in and around the environment. • Able to talk about and label the different seasons. • Able to identify seasons through observation (Autumn/Winter focus). • Comments on how and where different animals live in the environment. • Shows care and concern for animals and their environment. • Shows some understanding of different animal groups (minibeasts, birds, woodland, nocturnal etc). • Able to use books, media, pictures, ICT to identify different aspects in their natural environment. 	<ul style="list-style-type: none"> • Comments and asks questions about the environment. • Observes, labels and identifies aspects of the natural environment. • Makes marks, drawings and recordings of what they have observed. • Uses ICT/non-fiction books to seek information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Forest school sessions to build up interest, care and concern for the natural living world – bug hunt, leaf hunt, bird feeders, Autumn planting, patterns in nature, changes in nature. • Observational drawings of plants, natural objects, bugs etc. • Use non-fiction books and technology to find out about the natural world (nocturnal animals, bugs/minibeasts, birds, woodland animals, city animals). • Using iPads/cameras to take photos and record changes in nature and record bug finds etc. 	<ul style="list-style-type: none"> • Observe children’s ability to label and identify aspects of their environment. • Children notice and are able to talk about changes in the environment. • Children are able to label, identify and talk about different animal groups, such as nocturnal animals. • Observations of children’s talk and language about animals and the environment, in their learning environment, during trips, workshops and Forest School sessions.

Topic: All About Me
Term: Spring Cycle 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices similarities and differences in theirs and others bodies. • Notices changes to the body during exercise (breathing, heart rate etc). • Comments on changes they notice in and around the environment – body parts, bodily changes, growth and decay etc. • Demonstrates understanding of living a healthy lifestyle. • Talks about healthy eating, healthy bodies, lifestyle etc. • Able to label different parts of the body. • Able to talk about the function of different parts of the body. • Able to use books, media, pictures, ICT to identify body parts, simple life cycles, as well as to seek new information. 	<ul style="list-style-type: none"> • Comments and asks questions about themselves and others. • Observes, labels and identifies changes in the body (eg. during exercise). • Labels a simple life cycle. • Labels and identifies body parts. • Sorts and differentiates. • Makes marks, drawings and recordings of what they have observed. • Uses ICT/non-fiction books to seek information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Doctor/Nurse/Midwife visit – talking about healthy bodies, parts of the body etc. • Labelling different parts of the human body. • Looking at simple life cycles of the human and other animals, making comparisons. • City farm trip • Cooking activities promoting healthy eating/lifestyles. • Investigating our bodies e.g. looking at skeleton, x rays, labelling parts of the body, taking photos, comparing similarities and differences, hand and foot printing. • PD activities – observing changes in the body when we exercise (breathing, heart rate, sweating etc.) 	<ul style="list-style-type: none"> • Labels and identifies different parts of the body. • Demonstrates understanding of healthy lifestyles and healthy eating – active, food choices, changes in the body etc. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates – different life cycles. • Understanding of growth and decay. • Able to talk about changes in the body, for example a change in heart rate/breathing during exercise. • Uses ICT/non-fiction books to seek information.

**Topic: In the Garden
Term: Summer Cycle 1**

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices changes in and around the environment. • Able to talk about and label the different seasons. • Able to identify seasons through observation. • Comments on changes they notice in and around the environment – colours and patterns, growth and decay etc. • Identifies different fruits and vegetables and able to differentiate the two groups. • Can talk about and demonstrate where fruit and vegetables come from, how they grow etc. • Able to use books, media, pictures, ICT to identify different aspects in their natural environment, as well as to seek new information. 	<ul style="list-style-type: none"> • Observes, labels and identifies different plants and animal groups in the environment. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Understanding of growth and decay. • Identifies and labels simple animal life cycles/changes in animal life and habitats. • Uses ICT/non-fiction books to seek information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Visit to Hampstead Heath nature reserve. • Farm trip looking at animal groups and their habitats. • Garden classroom workshop. • Pond dipping – looking at plant life, and animals in their habitats. • Looking at life cycles e.g. butterfly, frogs, chicks. • Building dens in the garden. • Building bird and bug houses. 	<ul style="list-style-type: none"> • Observe children’s ability to label and identify aspects of their environment, animal groups, habitats, plants etc. • Children notice and are able to talk about changes in the environment looking at growth and decay, habitats and animal life cycles. • Observations of children’s talk and language about the environment, animal life cycles, growing and harvesting, decay, in their learning environment, during trips, workshops and Forest School sessions. <ul style="list-style-type: none"> • Demonstrates understanding of simple life cycles. • Shows care and concern for the living environment.

Topic: Food and Festivals
Term: Autumn Cycle 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Able to talk about and label the different animals/groups. • Comments on how and where different animals live in the environment. • Makes comparisons with different animal groups around the world. • Shows care and concern for animals and their environment. • Shows some understanding of different animal groups, particularly from other parts of the world (safari, jungle, polar, ocean etc). • Able to use books, media, pictures, ICT to seek new information. 	<ul style="list-style-type: none"> • Observes, labels and identifies different animal groups from around the world. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Makes comparisons. • Uses ICT/non-fiction books to seek information.
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> • Find out where different animals live around the world and locate on a map – sort into animals that live in hot places, cold places, rain forests, woodland, the ocean etc. • Farm visit – looking at animal groups, making comparisons with animals around the world. • Forest school – minibeast hunt, making comparisons with animals around the world. 	<ul style="list-style-type: none"> • Children are able to talk about different animal groups from around the world, where they come from etc. • Children can talk about similarities and differences between different habitats of animals from around the world.

Linked Units:	Year	EYFS	Topic	Materials
Autumn Cycle 1 – Into the Woods Autumn Cycle 2 – Food and Festivals Spring Cycle 2 - Imaginary Worlds Summer Cycle 2 – About Town				
				<ul style="list-style-type: none"> • Explore collections of materials looking at similar and different properties, talking about differences in materials and the changes they notice. • Explore how things work. • Explore and talk about different forces relating to materials (pushing, pulling, magnets, water, stretching etc). • Explore changes in the natural world (melting, freezing, floating, sinking, light, dark etc).

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Notices changes that happen in and around their environment.</p> <p>Explores different materials and their properties.</p> <p>Makes comparisons between different materials/textures.</p> <p>Explores different changes in state.</p> <p>Explores different forces.</p> <p>Talks about changes they notice with:</p> <ul style="list-style-type: none"> - Floating and sinking - Melting and freezing - Light and dark - Magnetic materials 	<ul style="list-style-type: none"> • Demonstrates curiosity with different materials and textures. • Can describe and compare different materials and textures. • Selects appropriate materials to complete a task. • Engages in practical investigations and experiments. • Can talk about changes they notice during practical tasks. • Able to label changes that are happening during practical tasks. • Can describe and make sense of changes that occur. • Relates what they have observed to other experiences. • Uses previous learning to build, explore and extend their own learning. • Problem solves and seeks to find solutions. • Uses ICT equipment to seek information and record their learning. • Uses non-fiction texts to seek information.
<p>Key vocabulary</p> <p>Senses – touch, feel, smell, see, look, taste, hear, listen Feel – smooth, rough, prickly, bumpy, coarse, slimy, squidgy, soft, fluffy, hard, cold, wet, dry Forces – push, pull, stretch, tight, float, sink, heavy, light, magnet/ic etc. Changes – melt/ing, freeze/ing, ice, cook, bake, liquid/wet, solid/hard etc.</p>	
Common misconceptions	
<p>Children may think that:</p> <ul style="list-style-type: none"> • Materials are always fabric/clothing 	

Topic: Into the Woods
Term: Autumn Cycle 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices and observes natural materials in the environment. • Able to identify different natural materials. • Makes comparisons between different materials. • Notices and talks about colours, textures etc. • Notices changes in weather and the affects this has (looking at change in light, water levels etc). 	<ul style="list-style-type: none"> • Makes observations of materials in their natural environment. • Labels and identifies different materials. • Describes different materials. • Compares different materials. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Uses ICT/non-fiction texts to seek information. • Uses ICT equipment to record information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Visit to Highgate Woods, looking for signs of Autumn, seasonal changes, look at patterns, colours and textures in the environment. • Leaf printing and printing with other natural objects, bark rubbings etc. • Explore the different weathers – rain collectors (measuring), wind mills and kites, exploring shadows. 	<ul style="list-style-type: none"> • Demonstrates curiosity of materials around the environment. • Can talk about different materials and what they look, feel like etc. • Can describe weather changes. • Talks about similarities and differences between materials (considering textures, colours etc).

Topic: Food and Festivals
Term: Autumn Cycle 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices seasonal changes. • Describes aspects of each season. • Notices changes in weather and the affects this has (looking at change in light, water levels, melting/freezing etc). • Understands the process of melting and freezing. • Able to talk about changes they notice when cooking. 	<ul style="list-style-type: none"> • Observes, labels and identifies different materials. • Describes and records changes they notice. • Compares different materials. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Uses ICT/non-fiction texts to seek information. • Uses ICT equipment to record information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Explore seasonal changes. • Explore different weather – patterns and changes (measuring, light, freezing, melting). • Cooking activities – explore changes that take place when cooking different foods e.g. changes of state. 	<ul style="list-style-type: none"> • Demonstrates curiosity around weather changes (eg. melting/freezing). • Can talk about weather changes they notice (eg. melting/freezing). • Can talk about and explain changes during cooking/baking tasks. • Notices and talks about patterns around the environment. • Labels and describes colours, patterns, textures etc.

Topic: Imaginary Worlds
Term: Spring Cycle 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices changes in state (dissolving, melting etc.) • Explores different materials and their properties. • Labels and can describe textures of different materials. • Makes comparisons between different textures. • Able to talk about changes they notice when cooking. • Explores different forces and changes around their environment. • Talks about changes they notice with: <ul style="list-style-type: none"> - Floating and sinking - Melting and freezing - Light and dark - Magnetic materials 	<ul style="list-style-type: none"> • Observes, labels and identifies different materials. • Describes and records changes they notice. • Compares different materials. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Takes part in practical problem solving and scientific experiments. • Uses ICT/non-fiction texts to seek information. • Uses ICT equipment to record information.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Investigate dissolving, mixing and melting. • Cooking activities which demonstrate change e.g. making bread, jelly, ice lollies, cakes. • Exploring senses e.g. feely bags, food tasting, texture collages, making instruments, sensory play etc. • Exploring floating and sinking. • Explore mixing materials e.g. make magic potions, using water play, mud kitchen, malleable materials, make wave jars/magic bottles/fairy jars – mixing oil, water and food colouring. • Explore chemical reactions and change e.g. make volcanoes, exploding paint, growing crystals. • Find out about dinosaurs – look at non-fiction texts, explore fossils. • Use metal detectors and magnets to find out about properties of materials e.g. make a fishing game, hunt for buried treasure. • Make boats and explore properties of materials. 	<ul style="list-style-type: none"> • Demonstrates curiosity with different materials and textures. • Can talk about different textures. • Can describe and compare different materials. • Engages in practical investigations and experiments. • Can talk about changes they notice during practical tasks (cooking, mixing, melting etc). • Notices and talks about patterns and change around the environment. • Able to label changes that are happening during practical tasks. • Can describe and make sense of changes that occur. • Relates what they have observed to other experiences.

Topic: About Town
Term: Summer Cycle 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Notices changes in state (dissolving, melting etc.) • Explores different materials and their properties. • Observes changes that happen around their environment. • Explores different forces and changes that happen. • Creates mechanisms that explore different forces (pushing, pulling etc). 	<ul style="list-style-type: none"> • Observes, labels and identifies different materials. • Describes and records changes they notice. • Compares different materials. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates.

<ul style="list-style-type: none"> • Talks about changes they notice with: <ul style="list-style-type: none"> - Floating and sinking - Melting and freezing - Light and dark - Magnetic materials 	<ul style="list-style-type: none"> • Takes part in practical problem solving and scientific experiments. • Investigates outcomes through trial and error and using previous learning. • Problem solves. • Uses ICT/non-fiction texts to seek information. • Uses ICT equipment to record information.
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> • Design and make a playground (small/ large scale) using blocks, PE equipment, loose parts, woodwork – explore forces, pushes and pulls. • Explore materials, sinking and floating, pushes and pulls and forces – make balloon cars, windmills, rockets, parachutes, roll vehicles down different slopes, make boats, explore pulleys and channels in sand and water play, create building sites. 	<ul style="list-style-type: none"> • Demonstrates curiosity with different materials and textures. • Can describe and compare different materials. • Selects appropriate materials to complete a task. • Engages in practical investigations and experiments. • Can talk about changes they notice during practical tasks. • Able to label changes that are happening during practical tasks. • Can describe and make sense of changes that occur. • Relates what they have observed to other experiences. • Uses previous learning to build, explore and extend their own learning. • Problem solves and seeks to find solutions.

Studied across the year	Year	EYFS	Topic	Seasonal changes
	<ul style="list-style-type: none"> Observe changes across the four seasons. 			

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Children can identify, label and describe the different seasons.</p> <p>They can talk about changes they notice in relation to the seasons.</p> <p>They can talk about weather changes and how these relate to the seasons.</p>	<ul style="list-style-type: none"> Able to identify the different seasons. Talks about the different seasons in some detail. Notices changes in the environment and links these changes to the seasons. Observes and talks about weather changes. Describes the cycle of a year (seasons) and understands that the seasons are a cycle. Demonstrates understanding of the need for seasons.
<p style="text-align: center;">Key vocabulary</p> <p>Seasons – Spring, Summer, Autumn, Winter Spring – buds, blossom, shoot, light, growth, chicks, lambs (baby animals), sun, rain, warm, plant, seed Summer – sun, hot, warm, green, luscious, rich, leaves, flowers, animals, bugs (bees, butterfly etc.) Autumn – change, fall, decay, colours (yellow, orange, red, brown, gold), hibernate, cold, rain Winter – decay, cold, rain, freeze, ice, bleak, dark Weather – sun/ny, hot, warm, rain, wet, cold, freeze, ice, melt, snow, cloud, storm, hail, lightening, thunder, rainbow, fog, drizzle</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> That it doesn't rain during Summer/it isn't sunny in Winter. It's always hot in Summer/always snows in Winter. 	
Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> Identifies the different seasons. Labels and describes the different seasons. Talks about changes that happen during the changing seasons. Understands the need for seasons. Understands that weather changes during the changing seasons. 	<ul style="list-style-type: none"> Observes, labels and identifies the seasons. Describes and records changes they notice. Compares the seasons. Makes marks, drawings and recordings of what they have observed. Uses ICT/non-fiction texts to seek information. Uses ICT equipment to record information.

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

Activities	Possible evidence
<ul style="list-style-type: none">• Visit to Highgate Woods, Hampstead Heath, local park trips to: look for signs of Autumn, Winter Spring, Summer, seasonal changes, look at patterns, colours and textures in the environment.• Forest school sessions to build up interest, care and concern for the natural living world – talk about changes in the environment and how they link to the different seasons throughout the year.• Explore seasonal changes over the year – Autumn, Winter, Spring, Summer• Explore different weather and how this affects the environment – relate to the seasons.• Sorting seasonal fruit and vegetable activities.• Planting and harvesting foods – talking and learning about seasonal fruit and vegetables.• Planting and looking at how foods grow. Looking at seasonal changes.• Spring changes – looking at life cycles and new growth.• Autumn/winter changes – looking at fall, change and decay.	<ul style="list-style-type: none">• Able to identify the different seasons.• Talks about the different seasons in some detail.• Notices changes in the environment and links these changes to the seasons.• Observes and talks about weather changes.• Describes the cycle of a year (seasons) and understands that the seasons are a cycle.• Demonstrates understanding of the need for seasons.

Linked Units: Autumn Cycle 1- Into the Woods Autumn Cycle 2 – Food and Festivals Summer Cycle 1 – In the Garden	Year	EYFS	Topic	Living things and their habitats
<ul style="list-style-type: none"> • Explores the natural world around them, making observations and drawing pictures of living things and their habitats. • Knows some similarities and differences between different habitats, animal and plant species. 				

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning	Possible evidence
<p>Notice changes in and around their environment, looking at plant life, animals and their habitats.</p> <p>Identifies different animal groups (ocean, woodland, minibeasts, nocturnal etc.) and can talk about where/how they live.</p> <p>Identifies different habitats and can make comparisons between them.</p> <p>Can talk about different life cycles.</p> <p>Shows care and concern for the living world.</p> <p>Can talk about where fruit and vegetables come from, how they grow etc.</p> <p>Understands that ICT/non-fiction books can be used to seek information.</p>	<ul style="list-style-type: none"> • Children will be able to talk about what they have observed in and around their environment. • Can identify different animal groups (from around the world) and talk about their similarities and differences. • Can make comparisons between different habitats. • Talks about and explains different life cycles of plants and animals. • Explores and demonstrates care for the living environment. • Demonstrates understanding that fruit and vegetables are grown. • Uses ICT equipment to record their observations. • Uses ICT/non-fiction texts to seek information.
Key vocabulary	
<p>Habitat – living, grow, survive, climate, food, shelter</p> <p>Various animal names</p> <p>Animal groups – nocturnal, woodland, ocean, rainforest, minibeasts etc.</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> • All habitats are the same • Plants are not living things • Habitats don't include plant life 	

Topic: Into the Woods
Term: Autumn Cycle 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Able to identify different animal groups (minibeasts, birds, woodland, nocturnal etc). • Can talk about animal habitats. • Notices similarities and differences between animal habitats. • Comments on how and where different animals live in the environment. • Shows care and concern for animals and their environment. • Uses ICT/non-fiction books to seek information. • Uses ICT equipment to record observations. 	<ul style="list-style-type: none"> • Comments on and questions what they have observed. • Identifies and labels different animal groups. • Describes and compares different habitats. • Makes comparisons. • Makes marks, drawings and recordings of what they have observed. • Uses ICT/non-fiction books to seek information. • Uses ICT equipment to record their findings.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Forest school sessions to build up interest, care and concern for the natural living world – bug hunt, bird feeders, dens, minibeasts and habitats. • Observational drawings of different habitats, bugs etc. • Use non-fiction books and technology to find out about different animals (nocturnal animals, bugs/minibeasts, birds, woodland animals, city animals). • Using iPads/cameras to take photos and record bug finds etc. • Using bug catchers to make observations. • Visit to Highgate Woods, looking at animal habitats. 	<ul style="list-style-type: none"> • Shows an interest in finding bugs and discovering in the natural environment. • Names different animals. • Able to talk about animal habitats, where they live etc. • Able to make comparisons between different animal groups and their habitats. • Uses books and ICT equipment to find out information.

Topic: In the Garden
Term: Summer Cycle 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Comments on changes they notice in and around the environment – colours and patterns, growth and decay etc. • Able to identify different animal groups (minibeasts, birds, woodland, nocturnal etc). • Can talk about animal habitats. • Can label a simple plant/animal life cycle. • Can talk about and demonstrate where fruit and vegetables come from, how they grow etc. • Describes life cycles of different animals and plants. • Notices similarities and differences between animal habitats. • Comments on how and where different animals live in the environment. • Shows care and concern for living things and their environment. • Uses ICT/non-fiction books to seek information. 	<ul style="list-style-type: none"> • Comments on and questions what they have observed. • Identifies and labels different animal groups. • Describes and compares different habitats. • Makes comparisons. • Observes and labels a plant life cycle. • Observes and labels an animal life cycle. • Makes marks, drawings and recordings of what they have observed. • Uses ICT/non-fiction books to seek information. • Uses ICT equipment to record their findings.

<ul style="list-style-type: none"> • Uses ICT equipment to record observations. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> • Visit to Hampstead Heath – looking at habitats in the environment. • Farm trip looking at animal groups and their habitats. • Pond dipping – looking at plant life, and animals in their habitats. • Looking at life cycles e.g. flower, butterfly, frogs, chicks. • Building dens in the garden. • Building bird and bug houses. • Go on a sensory walk in the garden or park. What can they see, hear, touch, smell etc. 	<ul style="list-style-type: none"> • Shows an interest in finding bugs and discovering in the natural environment. • Able to talk about animal habitats, where they live etc. • Able to make comparisons between different animal groups and their habitats. • Can identify, label and describe the changes of an animal life cycle. • Can talk about different animal habitats and makes comparisons. • Uses books and ICT equipment to find out information.
Topic: Food and Festivals Term: Autumn Cycle 2	
Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • Able to talk about and label the different animals/groups. • Comments on how and where different animals live in the environment. • Makes comparisons with different animal groups around the world. • Shows care and concern for living things and their environment. • Shows some understanding of different animal groups, particularly from other parts of the world (safari, jungle, polar, ocean etc). • Able to use books, media, pictures, ICT to seek new information. 	<ul style="list-style-type: none"> • Observes, labels and identifies different animal groups from around the world. • Makes marks, drawings and recordings of what they have observed. • Sorts and differentiates. • Makes comparisons. • Uses ICT/non-fiction books to seek information.
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence
<ul style="list-style-type: none"> • Find out where different animals live around the world and locate on a map – sort into animals that live in hot places, cold places, rain forests, woodland, the ocean etc. • Farm visit – looking at animal groups, their habitats, and making comparisons with animals around the world. • Forest school – minibeast hunt, habitats, and making comparisons with animals around the world. 	<ul style="list-style-type: none"> • Children are able to talk about different animal groups from around the world, where they come from, habitats etc. • Children can talk about similarities and differences between different habitats of animals from around the world.

Year 1

Overview of Topics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Who am I?	Celebrations	N/A	Enchanted Woodlands	Holiday (1 week)	Treasure Island
NC Programme of Study	<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> Everyday Materials 		<ul style="list-style-type: none"> Plants Animals Including Humans 	<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> Everyday Materials
Sequence of Lessons	Seasonal Changes					
Extension activities can be used from STEM.org	Week 1: My Body Activities Week 2: Carousel of senses activities Day 1: Smell Day 2: Taste Day 3: Sight Day 4: Touch Day 5: Hearing	Week 1: Light and Shadow Activities Day1: Candles (1,2) Day 2 : Sources of Light (3,4) Day 3 : In the dark dark cave Day 4: Shadows (1,2,3,4) Day 5: Shadow Puppets Week 2: Music for Celebration Activities		See separate planning Day 1: What is a habitat Day 2 : Woodland animals Day 3: Food Chains Day 4: Woodland Plants Day 5: Coniferous and deciduous tress Day 6: How animals are suited to their environment	By the Seaside Activities Day 1: Seashore Animals (1,2) Day 2: Sorting sets of animals (3,4,) Day 3: Class rockpool (6) Day 4 : Sea Shells (7) Day 5 : Protect the Environment (1,2)	Day 1 : Message in a bottle (1,2) Day 2: Shelter (1,2) Day 3: Outside Shelter (3) Day 4: Sun shade Day 5: Escape from the Island Day 6: Life jackets Day 7: Hard tack biscuits
Curriculum Enrichment			<ul style="list-style-type: none"> Natural History Museum 	<ul style="list-style-type: none"> Forest School Trees please Me Highgate Woods Fieldwork Science Fair 	<ul style="list-style-type: none"> Beach fieldwork 	
Inspirational Scientists	<i>Danielle Johnson Clinical Scientist in</i>	<i>Jyoti Sehdev Senior Civil engineer</i>	<i>Mary Anning</i>	<i>David Attenborough</i>	<i>Jemma Dias Animal Behaviour and</i>	<i>Pauline de Bigault de Cazanove</i>

Neurophysiology



*Emma Dunne
Palaeobiologist*



*Dr Anjana Khatwa
Earth scientist*



**Women in
Science Day
Ada Lovelace**



Welfare Scientist



*Dawood Qureshi
Marine biologist*



*Environmental
Chemist*



Linked Units: Spring 2- Enchanted Woodlands	Year	1	Topic	Plants
	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. 			
	Linked Prior Learning			

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	End of Year Expectations
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.	<ul style="list-style-type: none"> Can name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same 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	
Unit Vocabulary – Enchanted Woodlands	
Bluebell/ primrose/ moss/ oak tree/ pine tree/ snowdrop/ fern/ fungi/ beech tree/ horse chestnut tree	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> plants are flowering plants grown in pots with colored petals and leaves and a stem trees are not plants all leaves are green all stems are green a trunk is not a stem blossom is not a flower. 	

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

	Possible evidence
<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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

<ul style="list-style-type: none">• When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.	<ul style="list-style-type: none">• Can use photographs to talk about how plants change over time
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**Stand Alone Bespoke Unit: Enchanted Woodlands
Term: Spring 2**

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none">• Describe and name the petals, stem, leaf, bulb, flower, seed, stem and root of a plant.• Identify and name a range of common plants and trees.• Name the trunk, branches and root of a tree.• Discuss what they can see, touch, smell, hear or taste.• Identify living and non-living things.	<ul style="list-style-type: none">• To ask simple questions and recognise that they can be answered in different ways.• To observe closely.• To perform simple tests.• To identify and classify.• To gather and record data to help in answering questions.

Linked Units: Autumn 1 – Who Am I? Spring 2 – Enchanted Woodlands Summer 1- Holiday	Year	1	Topic	Animals, including humans
	<ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 			

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"> Can name a range of animals which includes animals from each of the vertebrate groups Can describe the key features of these named animals Can label key features on a picture/diagram Can write descriptively about an animal Can write a What am I? riddle about an animal Can describe what a range of animals eat Can play and lead ‘Simon says’ During PE lessons, can follow instructions involving parts of the body Can label parts of the body on pictures and diagrams Can explore objects using different senses
<p style="text-align: center;">Key vocabulary</p> <ul style="list-style-type: none"> Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves Names of animals experienced first-hand from each vertebrate group (see below) Parts of the body including those linked to PSHE teaching Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue <p>Unit Vocabulary – Who Am I? Key Words: ear lobe/ elbow/ nail/ chin / ears / elbow / eye socket /eyes / fingers / foot / feet / head / hear / hearing / hip / human / joints / knee / leg / neck / nose / ribs /see / sight /smell / spine / backbone / taste / thigh / toes / tongue / touch /vertebrae / wrist.</p> <p>Unit Vocabulary – Enchanted Woodlands Carnivore/ omnivore/ herbivore/ predator/ prey/ nocturnal/ diurnal / badger/ deer/ doormouse/ grass snake/ hedgehog/ owl/ woodpecker/ bat/ stag</p>	

beetle/ fox/ squirrel/ rabbit

Unit Vocabulary – Holiday

Habitat/ sunburn/ Marine biologist/ pollution animals / banded wedge shell / beach / cockle / shell crab / fish / habitat / limpet / mussel / periwinkle / pollution / protect / razor / recycle / rock pool / rubbish / sand / sea / shell / sun / sunglasses / sunscreen / turtles

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.

Common misconceptions

Some children may think:

- only four-legged mammals, such as pets, are animals
- humans are not animals
- insects are not animals
- all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group
- amphibians and reptiles are the same.

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

Activities

- Make first-hand, close observations of animals from each of the groups.
- Compare two animals from the same or different groups.
- Classify animals using a range of features.
- Identify animals by matching them to named images.
- Classify animals according to what they eat.
- Make first-hand close observations of parts of the body e.g. hands, eyes.
- Compare two people.
- Take measurements of parts of their body.
- Compare parts of their own body.
- Look for patterns between people e.g. Do people with big hands have big feet?
- Classify people according to their features.
- 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?

Possible evidence

- Can sort and group animals using similarities and differences
- Can use simple charts etc. to identify unknown animals
- Can create a drawing of an imaginary animal labelling its key features
- Can use secondary resources to find out what animals eat, including talking to experts e.g. pet owners, zookeepers etc.
- Can use first-hand close observations to make detailed drawings
- 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."
- 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."

Switched on Science Unit: Who Am I?

Term: Autumn 1

Learning Objectives

- To identify, name, draw and label the basic parts of the human body.
- To say which part of the body is associated with each sense.

Working Scientifically Skills

- To observe things using simple equipment.
- To identify and sort different things.
- To collect and record data to help answer questions.

Stand Alone Bespoke Unit: Enchanted Woodlands

Term: Spring 2

Learning Objectives

- Identify some of the differences between different animals.
- Identify and name a variety of common animals.
- Describe how an animal is suited to its environment.
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
- Name the parts of an animal's body.
- Name a range of domestic animals.
- Compare the bodies of different animals.

Working Scientifically Skills

- To ask simple questions and recognise that they can be answered in different ways.
- To observe closely.
- To perform simple tests.
- To identify and classify.
- To gather and record data to help in answering questions.

Switched on Science Unit: Holiday

Term: Summer 1

Learning Objectives

- To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
- To identify and name a variety of common animals that are carnivores, herbivores and omnivores.
- To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) distinguish between an object and the material from which it is made.
- To describe and compare the structure of a fish with humans and some other animals.

Working Scientifically Skills

- To ask simple questions and recognise that they can be answered in different ways.
- To observe closely, using simple equipment.
- To perform simple tests.
- To identify and classify.
- To use observations and ideas to suggest answers to questions.
- To gather and record data to help in answering questions.

Linked Units: Autumn 2– Celebrations Summer 2- Treasure Island	Year	1	Topic	Everyday materials
<ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. 				

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"> • Can label a picture or diagram of an object made from different materials • 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, shadow, sound, light source, source of sound</p> <p>Extension Vocabulary: Illuminate, light source, opaque, reflect, translucent, transparent, shadow, vibration</p> <p>Unit - Celebrations Key words: bark / battery / bright / bulb / candle / cool / dark / dull / fast / flame / flower /fruit / high / hot / leaf / leaves / light / liquid / loud / low / mirror / observe / plant / quiet / root / senses / shoot / slow / solid / texture / torch / wax / wick</p> <p>Unit – Treasure Island Key Words: Float/ Island/ Sink/ Waterproof/ Windproof/ binoculars / floating / food / human needs / shadows / shelter / sinking / sun/ telescope / water / waterproof / windproof / water / float / sink /</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"> • Classify objects made of one material in different ways e.g. a group of object made of metal. • Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. • Classify materials based on their properties. 	<ul style="list-style-type: none"> • Can sort objects and materials using a range of properties • Can choose an appropriate method for testing an object for a particular property • Can use their test evidence to answer the questions about properties e.g. "Which cloth is the most absorbent?"

- 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.

Switched on Science Unit: Celebrations Term: Autumn 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To distinguish between an object and the material from which it is made. • To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • To describe the simple physical properties of a variety of everyday materials. 	<ul style="list-style-type: none"> • To observe things using simple equipment. • To identify and classify. • To perform simple tests. • To use observations and ideas to suggest answers to questions. • To gather and record data to help in answering questions.

Switched on Science Unit: Treasure Island Term: Summer 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To describe the simple physical properties of a variety of everyday materials. 	<ul style="list-style-type: none"> • To ask simple questions and recognise that they can be answered in different ways. • To observe closely, using simple equipment. • To perform simple tests. • To identify and classify. • To use their observations and ideas to suggest answers to questions. • To gather and record data to help in answering questions.

Studied across the year	Year	1	Topic	Seasonal changes
	<ul style="list-style-type: none"> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. 			

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>	<ul style="list-style-type: none"> • Can name the four seasons and identify when in the year they occur • Can describe weather in different seasons over a year • Can describe days as being longer (in time) in the summer and shorter in the winter • Can describe other features that change through the year
Key vocabulary	
<ul style="list-style-type: none"> • Weather (sunny, rainy, windy, snowy etc.) • Seasons (winter, summer, spring, autumn) • Sun, sunrise, sunset, day length 	

Common misconceptions

Some children may think:

- it always snows in winter
- it is always sunny in the summer
- there are only flowers in spring and summer
- it rains most in the winter.

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

Activities	Possible evidence
<ul style="list-style-type: none"> • Collect information about the weather regularly throughout the year. • Present this information in tables and charts to compare the weather across the seasons. • Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. 	<ul style="list-style-type: none"> • Use the evidence gathered to describe the general types of weather and changes in day length over the seasons. • Use their evidence to describe some other features of their surroundings, e.g. themselves, animals, plants that change over the seasons

- Present this information in different ways to compare the seasons.
- Gather data about day length regularly throughout the year and present this to compare the seasons.
- Take One Tree – Follow a tree in the local park or school grounds and record the changes in the different seasons.
- Seasonal scavenger hunts and spotter's sheets.

- Demonstrate their knowledge in different ways e.g. making a weather forecast video, writing seasonal poetry, creating seasonal artwork

Year 2

Overview of Topics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Healthy Me	Materials Monster	Mini Worlds		Young Gardeners	Little Master Chefs
NC Programme of Study	<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> Uses of Everyday Materials 	<ul style="list-style-type: none"> Living things and their Habitats 		<ul style="list-style-type: none"> Plants 	<ul style="list-style-type: none"> Animals Including Humans
Sequence of Lessons	Lesson 1: Keeping Fit Lesson 2: Keep Fit Challenge Lesson 3: Healthy Eating Lesson 4: Healthy Snacks Lesson 5: Coughs and Sneezes	Lesson 1: The Materials Monster (Activities 2 and 3) Lesson 2: Researching Materials (Activities 4 and 5) Lesson 3: Materials Outside (Activities 6 and 7) Lesson 4: Where do materials come from? Lesson 5: Making something from recycled materials Lesson 6: Make a Materials Monster	Lesson 1: Mini Worlds Morning Lesson 2: Invertebrates Lesson 3: Plants Lesson 4: Make a Miniature Garden Lesson 5: Living Things (Activities 2,3,4) Lesson 6: Habitats (Activities 1,2,3,4) Lesson 7: Habitats – trip to Camley Street Lesson 8: Food Chains		Use the following activities from the Unit: Lesson 1: Activities 1 and 2 Lesson 2: Activities 4,5,and 6 Lesson 3: Activities 8,9 and 10 Lesson 4: Activities 14,15	Masterchefs: Lesson 1: Activity1 Lesson 2 : Activity 5 Lesson3 : Activity 6 Lesson 4: Activity 7 Let's Get Cooking 1. Pizza Plot Session Garden Classroom 2. Mixed Leaf Salad/ Design and make a salad 3. Carrot and Courgette 4. Bread Tasting/ Design and make a sandwich 5. Fruit Salad
Extension activities can be used from STEM.org						
Curriculum Enrichment	<ul style="list-style-type: none"> Science Museum 		<ul style="list-style-type: none"> Camley Street Natural Park Science Fair 		<ul style="list-style-type: none"> Sunflower competition 	<ul style="list-style-type: none"> Garden Classroom Session – Pizza Plot
Inspirational Scientists	<i>Eliza Hunt Chemist</i>	<i>Dr Pearl Agyakwa Materials scientist</i>	<i>Dr Ben Woodcock Ecological entomologist</i>		<i>Mary Seacole- Botanist</i>	<i>Tim Spector - Professor of Genetics, Author, and Co-Founder of ZOE Nutrition</i>



*Broc Drury
Immunologist*



*Rebecca Hand
Associate scientist*



*Dr Raquel Prado
Renewable
Materials Engineer*



Women in Science Day
*Dr Hyat Sindi
Scientist and innovator*



*Rachel Carson-
Marine Biologist and
Conservationist*



Linked Units: Spring – Mini Worlds	Year	2	Topic	Living things and their habitat
<ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead, and things that have never been alive • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Identify and name a variety of plants and animals in their habitats, including micro-habitats • 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 				

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"> • Can find a range of items outside that are living, dead and never lived • Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied • Can talk about how the features of these animals and plants make them suitable to the habitat • Can talk about what the animals eat in a habitat and how the plants provide shelter for them • 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"> • Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed • Names of local habitats e.g. pond, woodland etc. • Names of micro-habitats e.g. under logs, in bushes etc. <p>Unit – Mini Worlds Key words: eyepiece / hand lens / lens / magnifying glass / microscope / microscopic / miniature / naked eye / observe / fibres / small / smaller / air / alive / babies / breathe / compare / dead / grow / living / move / never / reproduce / sort / toilet / habitat / insect / bird / animal / plant / shelter / predator / prey / reproduce / eat / food / food chain / grass / hazel / hedgehog / mouse / nuts / plants / producers</p>	

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

- Explore the outside environment regularly to find objects that are living, dead and have never lived.
- Classify objects found in the local environment.
- Observe animals and plants carefully, drawing and labelling diagrams.
- Create simple food chains for a familiar local habitat from first-hand observation and research.
- Create simple food chains from information given e.g. in picture books (Gruffalo etc.).

Possible evidence

- Can sort into living, dead and never lived
- Can give key features that mean the animal or plant is suited to its micro-habitat
- Using a food chain can explain what animals eat
- 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

Switched on Science Unit: Mini Worlds Term: Spring 2

Learning Objectives

- To explore and compare the differences between things that are living, dead or that have never been alive.
- To identify that most living things live in habitats and micro-habitats to which they are suited.
- To describe how different habitats provide for the basic needs of different kinds of animals and plants.
- To describe how animals obtain their food from plants and other animals.
- To use the idea of a simple food chain.
- To identify and name different sources of food.

Working Scientifically Skills

- To observe closely.
- To identify and classify.
- To use observations and ideas to suggest answers to questions.
- To gather and record data to help in answering questions.

Linked Units: Summer 1– Young Gardeners Summer 2 – Little Masterchefs	Year	2	Topic	Plants
	<ul style="list-style-type: none"> • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 			

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE	
Show understanding of a concept using scientific vocabulary correctly	
Key learning	Possible evidence
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.	<ul style="list-style-type: none"> • Can describe how plants that they have grown from seeds and bulbs have developed over time • Can identify plants that grew well in different conditions
Key vocabulary	
As for Year 1 plus light, shade, sun, warm, cool, water, grow, healthy Unit – Young Gardeners Key words: annual / compost / flower / fruit / germinate / germination / fruit / health / healthy / leaf / plant / root / seed / seedling / soil / stem / vegetable / properties / materials / bulb / leaves/ corms/ tuber	
Common misconceptions	
Some children may think: <ul style="list-style-type: none"> • 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

- Make close observations of seeds and bulbs.
- Classify seeds and bulbs.
- Research and plan when and how to plant a range of seeds and bulbs.
- Look after the plants as they grow – weeding, thinning, watering etc.
- Make close observations and measurements of their plants growing from seeds and bulbs.
- Make comparisons between plants as they grow.

Possible evidence

- Can spot similarities and difference between bulbs and seeds
- Can nurture seeds and bulbs into mature plants identifying the different requirements of different plants

**Switched on Science Unit: Mini Worlds
Term: Spring 2**

Learning Objectives

- To identify and name a variety of plants.
- To observe and describe how seeds grow into mature plants.
- To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Working Scientifically Skills

- To ask simple questions and recognise that they can be answered in different ways.
- To observe closely, using simple equipment.
- To perform simple tests.
- To identify and classify.
- To use observations and ideas to suggest answers to questions.
- To gather and record data to help in answering questions.

**Switched on Science Unit: Young Gardeners
Term: Summer 1**

Learning Objectives

- To observe and describe how seeds and bulbs grow into mature plants

Working Scientifically Skills

- To observe closely.
- To use observations and ideas to suggest answers to questions.

Linked Units: Autumn 1 – Healthy Me Autumn 1 – Life Cycles Summer 2 – Little Masterchefs	Year	2	Topic	Animals, including humans
	<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 			

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"> • Can describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages • Can state the basic needs of animals, including humans, for survival • Can state the importance for humans of exercise, eating the right amounts of different types of food, and hygiene • Can name foods in each section of the Eatwell Guide
Key vocabulary	
<p>Unit – Life Cycles Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly),</p> <p>Unit – Healthy Me Key words: calm / calves / cough / exercise / feed / fitness / food / fruit / germs / happiness / health / healthy / hygiene /hygienic / muscle / needs / sneeze / stomach / thighs / vegetables/ heartbeat/ breathing/ disease</p> <p>Unit – Little Master Chefs Key words: bones / bread / change / chopping board / cook / dehydrate / digest / energy / fork fruit / frying pan / grow / heat / hot / hygiene / ingredients / knife / oven / rainbow / saucepan / spoon / strong / temperature / utensils / vegetables / whisk/ food types (examples – meat, fish, vegetables, bread, rice, pasta)</p>	

Common misconceptions

Some children may think:

- an animal's habitat is like its 'home'
- all animals that live in the sea are fish
- respiration is breathing
- breathing is respiration.

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

Activities

- Ask people questions and use secondary sources to find out about the life cycles of some animals.
- Observe animals growing over a period of time e.g. chicks, caterpillars, a baby.

Possible evidence

- 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

- Ask questions of a parent about how they look after their baby.
- Ask pet owners questions about how they look after their pet.
- Explore the effect of exercise on their bodies.
- Classify food in a range of ways, including using the [Eatwell Guide](#).
- Investigate washing hands, using glitter gel.

- Can measure/observe how animals, including humans, grow.
- Show what they know about looking after a baby/animal by creating a parenting/pet owners' guide
- Explain how development and health might be affected by differing conditions and needs being met/not met

**Switched on Science Unit: Healthy Me
Term: Autumn 1**

Learning Objectives

Working Scientifically Skills

<ul style="list-style-type: none"> To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> To observe closely. To perform simple tests. To identify and classify. To use observations and ideas to suggest answers to questions. To gather and record data in answering questions.
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Switched on Science Unit: Little Masterchefs
Term: Summer 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> To find out about and describe the basic needs of humans for survival (water, food and air). To describe the importance for humans of eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> To observe closely. To perform simple tests. To identify and classify. To use observations and ideas to suggest answers to questions. To gather and record data to help in answering questions.

Bespoke Science Unit: Life Cycles
Term : Autumn 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> To describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults 	<ul style="list-style-type: none"> To observe closely To use observations and ideas to suggest answers to questions.

Bespoke Science Unit: Caring for Pets
Term : Throughout the year

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> State the basic needs of animals, and humans for survival Show what they know about looking after an animal by caring for the school pets. 	<ul style="list-style-type: none"> To observe closely To use observations and ideas to suggest answers to questions.

Linked Units: Autumn 2 – Materials Monsters	Year	2	Topic	Uses of everyday materials
	<ul style="list-style-type: none"> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 			

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>	<ul style="list-style-type: none"> Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use Can label a picture or diagram of an object made from different materials For a given object can identify what properties a suitable material needs to have Whilst changing the shape of an object can describe the action used 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 Can recognise that a material may come in different forms which have different properties
<p>Key vocabulary</p> <p>Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard</p> <p>Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid</p> <p>Shape, push/pushing, pull/puling, twist/twisting, squash/squashing, bend/bending, stretch/stretching</p> <p>Unit – Materials Monster</p> <p>Key words: material/ properties/ absorbent / bend / brittle / bumpy / card / change / concrete / dull / elastic / fabric / flexible / glass / hard / man-made materials / metal / natural materials / opaque / paper / plastic / recycle / rough / rubber / shiny / smooth</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"> • Classify materials. • Make suggestions about alternative materials for a purpose that are both suitable and unsuitable • 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 	<ul style="list-style-type: none"> • Can sort materials using a range of properties • Can explain using the key properties why a material is suitable or not suitable for a purpose • Can begin to choose an appropriate method for testing a material for a particular property • Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?

Switched On Science Unit: Materials Monsters Term : Autumn 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • To find out how the shapes of solid objects made from some materials can be changed by, bending, twisting and stretching. 	<ul style="list-style-type: none"> • To observe closely. • To perform simple tests. • To identify and classify. • To use observations and ideas to suggest answers to questions. • To gather and record data to help in answering questions.

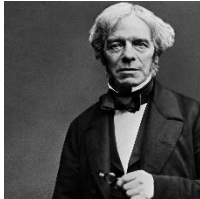
Year 3

Overview of Topics

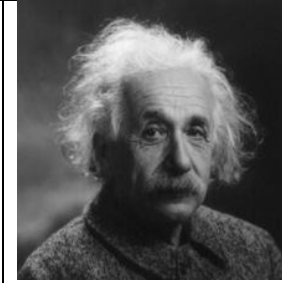
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Opposites Attract	Food and Our Bodies	Earth Rocks		Mirror Mirror	How Does Your Garden Grow
NC Programme of Study	<ul style="list-style-type: none"> Forces and Magnets 	<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> Rocks 		<ul style="list-style-type: none"> Light 	<ul style="list-style-type: none"> Plants
Sequence of Lessons Extension activities can be used from STEM.org	Lesson 1: What do Magnets Do? Lesson 2: Investigating Magnets Lesson 3: Sorted Lesson 4: Magnetic Circus Lesson 5: What are Magnetic Poles? Lesson 6: The Magnetic Rule	Lesson 1: Feeding Frenzy Lesson 2: Food Groups Lesson 3: Scary Skeletons Lesson 4: Protecting Muscles Lesson 5: Muscle madness Lesson 6: Bend and Flex	Lesson 1: Testing Rocks Lesson 2: Rocks for Dinner Lesson 3: Rock Families Lesson 4: Soil Investigation Lesson 5: Leaving an Impression Lesson 6: Is it a Fossil		Lesson 1: Looking at Reflection Lesson 2: Bouncing and Reflecting Lesson 3: Making Shadows Lesson 4: Playing with Shadows Lesson 5: Making Mirrors	Lesson 1: Plant Parts Lesson 2: Water Transportation Lesson 3: Let's Get Growing Lesson 4: Let There be Light Lesson 5: What is Pollen Lesson 6: Parts of the Flower Lesson 7: Seed Spreading
Curriculum Enrichment			<ul style="list-style-type: none"> Science Fair The Garden Classroom – The Rock Show Geo bus session Heath Learning 			<ul style="list-style-type: none"> Trip to Farm Camley Street - Plants
The Country Trust Project Food Discovery Programme Runs All Year						
Inspirational Scientists	<i>William Gilbert Physicain, Physicist and Natural Philosopher</i>	<i>Dr Zoë Ayres Water Scientist</i>	<i>Dr Fangxian Fang Earth scientist</i>		<i>Albert Einstein</i>	<i>Marie Clark Taylor Botanist</i>



*Michael Faraday
Natural philosopher
who contributed to
the study of
electromagnetism
and electrochemistry*



Women in Science Day
*Maria Da Penha
Bio pharmacist and Human Rights
Defender*



*Anna Atkins
Botanist*



*Dr. Tanisha Williams
Plant Scientist*



*Dr Susannah Bourne-
Worster
Theoretical Chemist*



Linked Units: Summer 2 – How Does Your Garden Grow	Year	3	Topic	Plants
	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 			

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"> Can explain the function of the parts of a flowering plant Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination Can give different methods of pollination and seed dispersal, including examples
<p>Key vocabulary</p>	
<p>Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)</p> <p><u>Unit – How Does Your Garden Grow</u></p> <p>Key Words: Root/ stem/ flower/ leaves/ veins/ germinate/ pollen/ pollination/ ovary/ sepals/ stamen/ carpel/ stigma/ style/ ovule/ petal</p>	

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"> • Observe what happens to plants over time when the leaves or roots are removed. • Observe the effect of putting cut white carnations or celery in coloured water. • 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. • Spot flowers, seeds, berries and fruits outside throughout the year. • Observe flowers carefully to identify the pollen. • Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. • Observe seeds being blown from the trees e.g. sycamore seeds. • Research different types of seed dispersal. • Classify seeds in a range of ways, including by how they are dispersed. • Create a new species of flowering plant. 	<ul style="list-style-type: none"> • Can explain observations made during investigations • Can look at the features of seeds to decide on their method of dispersal • 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

**Switched On Science Unit: How Does Your Garden Grow
Term : Summer 2**

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To identify and describe the functions of the different parts of flowering plants – roots, stem, leaves and flowers. • To investigate how water is transported within plants. • To explore exactly what plants need to live and grow, and how these requirements vary from plant to plant. • To explore the important role that flowers play in the life cycles of plants, from pollination to seed spreading. • 	<ul style="list-style-type: none"> • To set up simple practical enquiries • To ask relevant questions and use different types of scientific enquiry to answer them. • To record the findings using drawings and labelled diagrams.

Linked Units: Autumn 2 – Food and Bodies	Year	3	Topic	Animals, including humans
	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food – they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 			

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"> Can name the nutrients found in food Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection Can describe how muscles and joints help them to move
Key vocabulary	
<p>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints</p> <p><u>Unit – Food and Bodies</u></p> <p>Key Words: Nutrients/ proteins/ fats/ balanced diet/ carbohydrates/ skeleton/ exoskeleton/ femur/ humerus/ Contract/ relax/ muscle/ joint</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> certain whole food groups like fats are ‘bad’ for you certain specific foods, like cheese are also ‘bad’ for you diet and fruit drinks are ‘good’ for you snakes are similar to worms, so they must also be invertebrates 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"> • Classify food in a range of ways. • Use food labels to explore the nutritional content of a range of food items. • Use secondary sources to find out the types of food that contain the different nutrients. • Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? • Plan a daily diet to contain a good balance of nutrients. • Explore the nutrients contained in fast food. 	<ul style="list-style-type: none"> • Can classify food into those that are high or low in particular nutrients • Can answer their questions about nutrients in food, based on their gathered evidence • Can talk about the nutrient content of their daily plan
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<ul style="list-style-type: none"> • Use secondary sources to research the parts and functions of the skeleton. • Investigate patterns asking questions such as: • Can people with longer legs run faster? • Can people with bigger hands catch a ball better? • Compare, contrast and classify skeletons of different animals. 	<ul style="list-style-type: none"> • Use their data to look for patterns (or lack of them) when answering their enquiry question • Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons
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Switched On Science Unit: Food and Bodies
Term : Autumn 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To find out about healthy and balanced diets. • To describe the basic parts of the skeletal system. • To observe and compare animals with and without skeletons. • To look at joints, and how bones and muscles help us move. • 	<ul style="list-style-type: none"> • To gather, record and present data in different ways • To make systematic and careful observations.

Linked Units: Spring 2 – Earth Rocks	Year	3	Topic	Rocks
	<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are made from rocks and organic matter. 			

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"> • Can name some types of rock and give physical features of each • Can explain how a fossil is formed • Can explain that soils are made from rocks and also contain living/dead matter
Key vocabulary	
<p>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</p>	
<p><u>Unit – Earth Rocks</u></p> <p>Key Words: mineral/ rock/ permeable/ impermeable/ crystals/ ore / igneous/ magma/ sedimentary/ granite/ sandstone/ clay/ marble/ limestone/ humus/ fossil/ extinct/ paleontologist</p>	

Common misconceptions

Some children may think:

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

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

Activities	Possible evidence
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<ul style="list-style-type: none"> • Observe rocks closely. • Classify rocks in a range of ways, based on their appearance. • Devise a test to investigate the hardness of a range of rocks. • Devise a test to investigate how much water different rocks absorb. 	<ul style="list-style-type: none"> • Can classify rocks in a range of different ways, using appropriate vocabulary • Can devise tests to explore the properties of rocks and use data to rank the rocks
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<ul style="list-style-type: none"> • Observe how rocks change over time e.g. gravestones or old building. • Research using secondary sources how fossils are formed. • Observe soils closely. • Classify soils in a range of ways based on their appearance. • Devise a test to investigate the water retention of soils. • Observe how soil can be separated through sedimentation. • Research the work of Mary Anning. 	<ul style="list-style-type: none"> • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily • 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. • Can identify plant/animal matter and rocks in samples of soil • Can devise a test to explore the water retention of soils
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Switched On Science Unit: Earth Rocks
Term : Spring 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To explore different kinds of rocks and their properties. • To explore different types of rock families. • To recognise that soil comes from rock. • To find out how fossils are formed. 	<ul style="list-style-type: none"> • To collect and record data from observations and tests. • To set up and carry out simple, practical activities and fair tests. • To use results to draw conclusions and suggest improvements or new questions.

Linked Units: Autumn 2 – Mirror Mirror	Year	3	Topic	Light
	<ul style="list-style-type: none"> • Recognise that they need light in order to see things, and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change. 			

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"> • Can describe how we see objects in light and can describe dark as the absence of light • Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses • Can define transparent, translucent and opaque • Can describe how shadows are formed
Key vocabulary	
<p>Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous</p> <p><u>Unit – Mirror Mirror</u></p> <p>Key Words: Dull/ shiny / reflect / mirror / observation / explanation / light source / shadow / transparent / translucent / opaque / description</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> • we can still see even where there is an absence of any light • our eyes 'get used to' the dark • the moon and reflective surfaces are light sources • a transparent object is a light source • shadows contain details of the object, such as facial features on their own shadow • shadows result from objects giving off darkness. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence

<ul style="list-style-type: none"> • Explore how different objects are more or less visible in different levels of lighting. • Explore how objects with different surfaces (e.g. shiny vs matt) are more or less visible. 	<ul style="list-style-type: none"> • Can describe patterns in visibility of different objects in different lighting conditions and predict
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<ul style="list-style-type: none"> • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. • Choose suitable materials to make shadow puppets. • Create artwork using shadows. 	<p>which will be more or less visible as conditions change</p> <ul style="list-style-type: none"> • Can clearly explain, giving examples, that objects are not visible in complete darkness • Can describe and demonstrate how shadows are formed by blocking light • Can describe, demonstrate and make predictions about patterns in how shadows vary
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Switched On Science Unit: Mirror Mirror
Term : Summer 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To describe the reflections when light is reflected from surfaces. • To describe how shadows are formed. • To make a simple mirror and create a list of the key uses 	<ul style="list-style-type: none"> • To record observations and make sense of them. • To design and carry out a fair test.

Linked Units: Autumn 1- Opposites Attract	Year	3	Topic	Forces and magnets
	<ul style="list-style-type: none"> • Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. 			

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> <p>For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.</p>	<ul style="list-style-type: none"> • Can give examples of forces in everyday life • Can give examples of objects moving differently on different surfaces • Can name a range of types of magnets and show how the poles attract and repel • Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets
Key vocabulary	
<p>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</p> <p>Unit – Opposites Attract</p> <p>Key Words: force / magnet / contact / non contact / attract / repel / magnetic /non magnetic / iron / pole / compass / magnetic north / prediction</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> • the bigger the magnet the stronger it is • all metals are magnetic. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence

<ul style="list-style-type: none"> • 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. • Explore what materials are attracted to a magnet. • Classify materials according to whether they are magnetic. 	<ul style="list-style-type: none"> • Can use their results to describe how objects move on different surfaces • Can use their results to make predictions for further tests e.g. it will spin for longer on this
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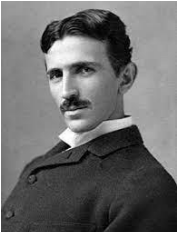
<ul style="list-style-type: none"> • Explore the way that magnets behave in relation to each other. • Use a marked magnet to find the unmarked poles on other types of magnets. • Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. • Devise an investigation to test the strength of magnets. 	<p>surface than that, but not as long as it spun on that surface</p> <ul style="list-style-type: none"> • Can use classification evidence to identify that some metals, but not all, are magnetic • Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles • Can use test data to rank magnets
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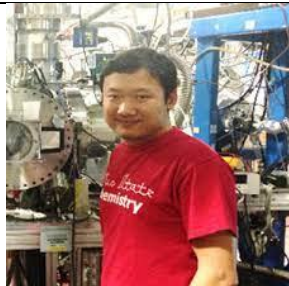
Switched On Science Unit: Opposites Attract
Term : Autumn 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To observe the forces that magnets produce. • To name some materials that magnets can attract and some they cannot. • To list at least ten uses of magnets in everyday life. • To explain what a magnetic pole is and what it can do. • To predict whether two magnets will attract or repel each other. 	<ul style="list-style-type: none"> • To report and present findings from enquiries.

Year 4

Overview of Topics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Power It Up	Teeth and Eating	Looking at States		What's the Sound	Living Things
NC Programme of Study	<ul style="list-style-type: none"> Electricity 	<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> States of Matter 		<ul style="list-style-type: none"> Sound 	<ul style="list-style-type: none"> Living Things and Their Habitats
Sequence of Lessons	Lesson 1: Which Source? Lesson 2: What a Shocker Lesson 3: Simple Circuits Lesson 4: Changing Circuits Lesson 5: Conductors Lesson 6 : Crime Fighters	Lesson 1: First Impressions Lesson 2: Tough Teeth Lesson 3: Food's Incredible Journey Lesson 4: Let's make a Stomach Reaction Lesson 5: A Chain Lesson 6 : Who Do You Eat?	Lesson 1 : What a State! Lesson 2: A Watery end Lesson 3: It's Melting Lesson 4: Let's Make Ice cream Lesson 5: Whatever the weather Lesson 6: Ziggy's Clothes		Lesson 1: Let's Make a Sound/ Let's Make it Louder Lesson 2: Can you Hear It? Lesson 3: Sound it out? Lesson 4 : Pitch Up	Lesson 1: Who am I? Lesson 2: Key to the problem? Lesson 3: We're Going on a Bug Hunt? Lesson 4: A Bug's Life? Lesson 5: High Five Lesson 6 : Flower Power
Extension activities can be used from STEM.org						
Curriculum Enrichment		<ul style="list-style-type: none"> Science Museum - 	<ul style="list-style-type: none"> Science Fair Canal Museum - ice workshop 		<ul style="list-style-type: none"> Music production workshop 	<ul style="list-style-type: none"> Camley Street – Animals session
Inspirational Scientists	Nikola Tesla 	<i>Dr Yogesh Kumar</i> <i>Applications Scientist</i>	<i>Dr Rabi Chhantyal-Pun</i> <i>Atmospheric chemist</i>		<i>Harriet Withey</i> <i>Clinical Scientist Audiology</i>	<i>Tanesha Aleen</i> <i>Zoologist</i>



*Dr Anwar Khan -
Atmospheric scientist*



Women in Science Day
*Tu You You – Chemist (First
woman in China to receive
Nobel prize)*



*Serian Sumner
Behavioral ecologist*



<https://www.greatscienceshare.org/find-a-scientist-biogs/harriet-withey>

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

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning

Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things.

Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.

Key vocabulary

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

Unit – Living Things

Key Words: classify / key / organism / habitat / invertebrate / insect / millipede / centipede / vertebrate / mammal / bird . amphibian / reptile / fish / flowering plant

Possible evidence

- Can name living things living in a range of habitats, giving the key features that helped them to identify them
- Can give examples of how an environment may change both naturally and due to human impact

Common misconceptions

Some children may think:

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

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

Activities

- Observe plants and animals in different habitats throughout the year.
- Compare and contrast the living things observed.
- Use classification keys to name unknown living things.
- Classify living things found in different habitats based on their features.
- Create a simple identification key based on observable features.
- Use fieldwork to explore human impact on the local environment e.g. litter, tree planting.
- Use secondary sources to find out about how environments may naturally change.
- Use secondary sources to find out about human impact, both positive and negative, on environments.

Possible evidence

- Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)
- Can use classification keys to identify unknown plants and animals
- Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter

**Switched On Science Unit: Living Things
Term : Summer 2**

Learning Objectives

- To explain how living things can be classified.
- To recognise how a simple key helps identify living things.
- To observe key features of living things.
- To examine invertebrates in their environment.
- To identify invertebrates with a simple key.
- To recognise that environments change.
- To understand some of the human impacts on specific habitats.
- To understand that living things can be classified using a key.
- To be able to classify the five vertebrate groups based on physical features.
- To be able to classify plants as flowering or non-flowering.
- To devise and use a key to identify common trees from their leaves.

Working Scientifically Skills

- To ask questions that can be used to construct a key.
- To make careful observations
- To ask relevant questions in order to sort and classify

Linked Units: Autumn 2 – Teeth and Eating	Year	4	Topic	Animals, including humans
<ul style="list-style-type: none"> • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct and interpret a variety of food chains, identifying producers, predators and prey. 				

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> <p>Living things can be classified as producers, predators and prey according to their place in the food chain.</p>	<ul style="list-style-type: none"> • Can sequence the main parts of the digestive system • Can draw the main parts of the digestive system onto a human outline • Can describe what happens in each part of the digestive system • Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for • Can name producers, predators and prey within a habitat • Can construct food chains
Key vocabulary	
<p>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</p> <p>Unit – Teeth and Eating Key Words: molar/ canine / incisor / enamel / decay / digestion / mouth / oesophagus / stomach / small intestine / large intestine / anus / nutrients / energy carnivore / herbivore / omnivore / molars / canines / incisors</p>	

Common misconceptions

Some children may think:

- arrows in a food chains mean 'eats'
- the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain
- there is always plenty of food for wild animals
- your stomach is where your belly button is
- food is digested only in the stomach
- when you have a meal, your food goes down one tube and your drink down another
- the food you eat becomes "poo" and the drink becomes "wee".

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

Activities

- Research the function of the parts of the digestive system.
- Create a model of the digestive system using household objects.
- Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing).
- Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.
- Use food chains to identify producers, predators and prey within a habitat.
- Use secondary sources to identify animals in a habitat and find out what they eat.

Possible evidence

- Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part
- Can record the teeth in their mouth (make a dental record)
- Can explain the role of the different types of teeth
- Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores
- Can create food chains based on research

Switched On Science Unit: Teeth and Eating Term : Autumn 2

Learning Objectives

- To classify and identify different types of teeth and their functions.
- To recognise why and how we must take good care of them.
- To describe the functions of parts of the human digestive system.
- To make observations and record findings using scientific language and labelled diagrams
- To recognise what a food chain represents.
- To construct and interpret a variety of food chains.
- To identify producers, predators and prey

Working Scientifically Skills

- To make observations and form conclusions

Linked Units: Spring 2 – Looking at States	Year	4	Topic	States of matter
	<ul style="list-style-type: none"> • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			

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 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.</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> • 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
Key vocabulary	
Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	
Unit – Looking at States Key Words: solid / liquid / gas / matter / temperature / thermometer / melting / freezing / melting point / freezing point / evaporation / boiling point / condensing / water cycle / boiling	
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

- Observe closely and classify a range of solids. Observe closely and classify a range of liquids.
- 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.
- Classify materials according to whether they are solids, liquids and gases.
- Observe a range of materials melting e.g. ice, chocolate, butter.
- Investigate how to melt ice more quickly.
- Observe the changes when making rocky road cakes or ice-cream.
- Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate.
- Explore freezing different liquids e.g. tomato ketchup, oil, shampoo.
- Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration).
- Observe water evaporating and condensing e.g. on cups of icy water and hot water.
- Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers.
- Use secondary sources to find out about the water cycle.

Possible evidence

- Can give reasons to justify why something is a solid liquid or gas
- Can give examples of things that melt/freeze and how their melting points vary
- From their observations, can give the melting points of some materials
- Using their data, can explain what affects how quickly a solid melts
- Can measure temperatures using a thermometer
- Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup
- From their data, can explain how to speed up or slow down evaporation
- Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet

Switched On Science Unit: Looking at States
Term : Spring 2

Learning Objectives

- To compare materials.
- To group materials together, based on observations.
- To recognise that some materials, for example water, may exist in solid, liquid and gas states.
- To make careful observations about how matter changes from solid to liquid.
- To read scales accurately.
- To observe that materials change state when they are heated and cooled.
- To recognise when these processes, called freezing, boiling and melting, take place.
- To measure and research temperatures in degrees Celsius.
- To explore patterns in freezing and melting.
- To recognise when evaporation and condensation take place.
- To explore what happens to a material that is evaporating or condensing.
- To identify the part played by evaporation and condensation in the water cycle.

Working Scientifically Skills

- To record what has been learnt in a variety of ways
- To use research skills to find out about temperature
- To use research skills to find out about temperature.
- To make careful observations and record these

Linked Units: Summer 1 – What's the Sound	Year	4	Topic	Sound
	<ul style="list-style-type: none"> • Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. • Find patterns between the pitch of a sound and features of the object that produced it. • Find patterns between the volume of a sound and the strength of the vibrations that produced it. • Recognise that sounds get fainter as the distance from the sound source increases. 			

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 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.</p> <p>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.</p> <p>Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</p>	<ul style="list-style-type: none"> • 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
<p>Key vocabulary</p> <p>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation</p>	
<p>Unit – What's the Sound Key Words: vibration / volume / pitch</p>	
Common misconceptions	
<p>Pitch and volume are frequently confused, as both can be described as high or low.</p> <p>Some children may think:</p> <ul style="list-style-type: none"> • 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
- Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium

**Switched On Science Unit: What's the Sound
Term : Summer 1**

Learning Objectives

- To observe and name a variety of sources of sound.
- To notice that we hear with our ears.
- To identify how sounds are made, associating some of them with something vibrating.
- To find patterns between the volume of a sound and the strength of the vibrations that produce it.
- To identify similarities and differences between sounds made in different ways.
- To recognise that sounds get fainter as the distance from the sound source increases.
- To explore various ways of making sounds with different pitches.
- To find patterns between the pitch of a sound and the features of the object that produced it.
- To use the instruments designed in class to play a recognisable tune.

Working Scientifically Skills

- To identify patterns in data
- To use results to form conclusions
- To use evidence to answer questions

Linked Units: Autumn 1 - Power It Up	Year	4	Topic	Electricity
	<ul style="list-style-type: none"> Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors. 			

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning

Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off.

Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.

Key vocabulary

Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

Unit – Power It Up

Key Words: Battery/ mains/ bulb / rechargeable / cell/ bulb/ circuits/ components / terminals / wires / switch /

N.B.

Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.

Possible evidence

- Can name the components in a circuit
- Can make electric circuits
- Can control a circuit using a switch
- Can name some metals that are conductors
- Can name materials that are insulators

Common misconceptions

Some children may think:

- electricity flows to bulbs, not through them
- electricity flows out of both ends of a battery
- electricity works by simply coming out of one end of a battery into the component.

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

Activities

- Construct a range of circuits.
- Explore which materials can be used instead of wires to make a circuit.
- Classify the materials that were suitable/not suitable for wires.
- Explore how to connect a range of different switches and investigate how they function in different ways.
- Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm.
- Apply their knowledge of conductors and insulators to design and make different types of switch.
- Make circuits that can be controlled as part of a DT project.

N.B.

Children should be given one component at a time to add to circuits.

Possible evidence

- Can communicate structures of circuits using drawings which show how the components are connected
- Use classification evidence to identify that metals are good conductors and non-metals are insulators
- Can incorporate a switch into a circuit to turn it on and off
- Can connect a range of different switches identifying the parts that are insulators and conductors
- Can add a circuit with a switch to a DT project and can demonstrate how it works
- Can give reasons for choice of materials for making different parts of a switch
- Can describe how their switch works

**Switched On Science Unit: Power It Up
Term : Autumn 1**

Learning Objectives

- To identify common appliances that run on electricity.
- To classify and record appliances as mains or battery operated.
- To understand the difference between mains and battery-operated appliances.
- To understand that electricity can be dangerous
- To recognise what is needed in order to make a bulb light in a circuit.
- To recognise and name some of the components that can be used to make a circuit.
- To explore patterns produced by altering circuits, making comparative tests.
- To recognise that some materials conduct electricity.
- To recognise that some materials do not conduct electricity.
- To use a simple circuit to create a device.

Working Scientifically Skills

- To use results to draw simple conclusions
- To apply prior learning to a problem or question

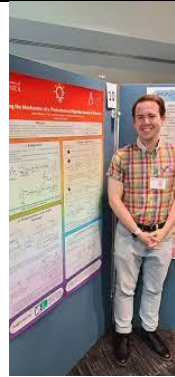
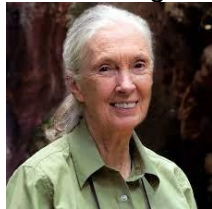
Year 5

Overview of Topics

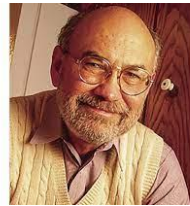
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Circle of life	Material World	Let's Get Moving		Growing Up and Getting Old	Out of this World
NC Programme of Study	<ul style="list-style-type: none"> Living Things and their Habitats 	<ul style="list-style-type: none"> Materials and their Properties 	<ul style="list-style-type: none"> Forces 		<ul style="list-style-type: none"> Animals Including Humans 	<ul style="list-style-type: none"> Earth and Space
Sequence of Lessons Extension activities can be used from STEM.org	Lesson 1 : Making New Plants Lesson 2: Taking Plant Cuttings Lesson 3: Metamorphosis Lesson 4: What Came First Lesson 5: Finding a Mate Lesson 6 :Endangered Animals Lesson 7: Circle of Life - Planting	Lesson 1: Why That Material? Lesson 2: Foamy Fun Lesson 3: Going Going Gone Lesson 4: Mix It Up Lesson 5: Signs of Change Lesson 6: Signs of Change Lesson 7: Signs of Change Lesson 8: Goopy Materials	Week 1 : Lesson 1 : Down We Go Lesson 2: Falling objects Lesson 3: Rubbing Together Lesson 4: Water Resistance Lesson 5: Simple machines Lesson 6: Make a machine Lesson 7: Make a machine		Lesson 1: Cradle to Grave Lesson 2: Baby Boom Lesson 3 : Growing Up/ Terrible Teenagers Lesson 4: Act Your Age / Live Forever	Lesson 1: What's in our Solar System? Week 2: Let's make a Solar System Lesson 3: What is at the Centre of the Solar System? Lesson 4 : Galileo! Galileo! Lesson 5: What Makes a Month? Lesson 6: What is a Time Zone
Curriculum Enrichment	<ul style="list-style-type: none"> GC - How Plants Grow 	<ul style="list-style-type: none"> 				<ul style="list-style-type: none"> GC – Earth and Beyond The Royal Observatory Greenwich
Inspirational Scientists	<i>Dr Kelsey Byers Evolutionary Biologist</i>	<i>James Mortimer Photochemist</i>	<i>Galileo Astronomer, physicist and engineer,</i>		<i>Dr Jo Montgomery Animal Behavioral Neuroscientist</i>	<i>Ptolemy Mathematician, astronomer, astrologer</i>



*Jane Goodall
Primatologist*



*Spencer Silver
Inventor of the Post It*



*Ruth Benerito –
Chemist and inventor*



*Gunay Shamilova
Corrosion Engineer*



*Isaac Newton
Mathematician, physicist, astronomer,
alchemist*



Women in Science Day

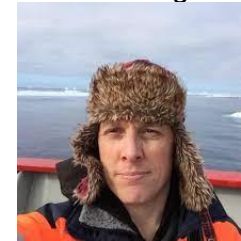
*Gladys West – Mathematician
(Development of GPS)*



*Link to Geography
Prem Singh Gill
Polar scientist*



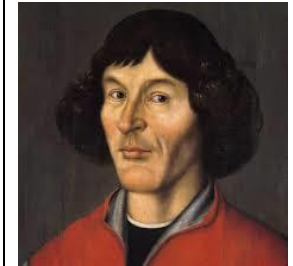
*Huw Griffiths-
Marine Biologist*



*Alhazen
Mathematician,
astronomer, and
physicist*



*Copernicus-
mathematician,
astronomer*



*Professor Karen
Aplin
Atmospheric and
space scientist*




*Mae Jameson
Astronaut and
Engineer*



*Vanessa Emeka
Okafor
Astrophysicist*



*Stephen Hawking
Physicist*

					 <p data-bbox="2049 391 2134 438">S.W. Harding</p>
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Linked Units: Autumn 1 - Circle of Life	Year	5	Topic	Living things and their habitats
<ul style="list-style-type: none"> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals. 				

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>	<ul style="list-style-type: none"> Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways
Key vocabulary	
<p>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</p> <p>Unit – Circle of Life Key Words: bulb / fertilization / pollination / sexual reproduction / asexual reproduction / larva / gestation / metamorphosis / sperm / fertilization / internal fertilization / external fertilisation</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> all plants start out as seeds all plants have flowers plants that grow from bulbs do not have seeds only birds lay eggs. 	

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

Activities

- Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals.
- Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth.

Possible evidence

- 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
- Can identify patterns in life cycles

- Look for patterns between the size of an animal and its expected life span.
- Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.
- Take cuttings from a range of plants e.g. African violet, mint.
- Plant bulbs and then harvest to see how they multiply.
- Use secondary sources to find out about pollination.

- Can compare two or more animal life cycles they have studied
- Can explain how a range of plants reproduce asexually

**Switched On Science Unit: Circle of Life
Term : Autumn 1**

Learning Objectives

- Describe the life processes of reproduction in some plants.
- To explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- To describe the life process of reproduction in some animals.

Working Scientifically Skills

- Taking measurements and presenting findings from enquiries
- To report and present findings from enquiries.

Linked Units: Summer 1 – growing Up and Getting Old	Year	5	Topic	Animals, including humans
	<ul style="list-style-type: none"> Describe the changes as humans develop to old age. 			

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"> statutory guidance on Physical health and mental wellbeing (primary and secondary). <p>Other useful guidance includes:</p> <ul style="list-style-type: none"> Joint briefing on teaching about puberty in KS2 from PHSE Association and Association for Science Education Briefing on humans development and reproduction in the Primary Curriculum from PHSE Association and Association for Science Education. 	<ul style="list-style-type: none"> Can explain the changes that takes place in boys and girls during puberty Can explain how a baby changes physically as it grows, and also what it is able to do
Key vocabulary	
<p>Puberty – the vocabulary to describe sexual characteristics</p> <p>Unit – Growing Up and Getting Old Key Words: pregnant /gestation period / adolescence /puberty /menstruation / Arthritis/ life expectanc</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> a baby grows in a mother's tummy a baby is "made". 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence

<p>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</p>	<ul style="list-style-type: none"> • Can present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to 'problem page questions'
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<p>expert e.g. school nurse to provide answers to questions that have been filtered by the teacher.</p>	
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Switched On Science Unit: Growing Up and Getting Old
Term : Summer 1

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To describe some of the changes that happen as humans develop. • To compare and analyse the gestation periods of different animals. • To look at the changes that happen as we get older, including puberty/adolescence. • To collect and compare data on average heights as we grow up. • To describe the changes that happen to us as we enter old age. • To consider the impact of living longer. 	

Linked Units: Autumn 2 – Material World	Year	5	Topic	Properties and changes of materials
	<ul style="list-style-type: none"> • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 			

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"> • Can use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings • Can explain what dissolving means, giving examples • Can name equipment used for filtering and sieving • Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving • Can describe some simple reversible and non-reversible changes to materials, giving examples
<p style="text-align: center;">Key vocabulary</p> <p>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material</p> <p>Unit – Material World</p> <p>Key Words: hard / tough / strong / rigid / elastic / plastic / flexible / electrical conductor / thermal conductor / solution / solute / solvent / dissolve / evaporate / mixture / soluble / insoluble / filter / reversible physical change / irreversible chemical change / burning</p>	

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"> • 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. • Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. • Investigate rates of dissolving by carrying out comparative and fair test. • Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. • Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. • 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? • 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"> • Can create a chart or table grouping/comparing everyday materials by different properties • Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose • Can group solids based on their observations when mixing them with water • Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water • Can explain the results from their investigations

**Switched On Science Unit: Material world
Term : Autumn 2**

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To identify the properties of a range of materials and explain their uses. • To explore making and separating mixtures. • To classify changes as reversible or irreversible. 	<ul style="list-style-type: none"> • To plan comparative or fair tests and then take accurate measurements and make accurate observations. • To use relevant scientific language to explain

their ideas.

- To report and present findings from enquiries

Linked Units: Summer 2 – Out of this World	Year	5	Topic	Earth and space
	<ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. 			

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 365¼ 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>	<ul style="list-style-type: none"> Can create a voice over for a video clip or animation Can show, using diagrams, the movement of the Earth and Moon Can explain the movement of the Earth and Moon Can show using diagrams the rotation of the Earth and how this causes day and night Can explain what causes day and night
<p>Key vocabulary</p> <p>Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets</p>	
<p>Unit – Out of this World</p> <p>Key Words: solar system / sun / star / planet / centric / geocentric / heliocentric / timeline / daytime / night time / orbit / time zone</p>	

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

**Switched On Science Unit: Out of This World
Term : Summer 2**

Learning Objectives

- To learn how the planets in our Solar System are organised.
- To use mathematics to model the dimensions of our Solar System.
- To describe the movement of the Earth and Moon relative to the Sun in our Solar System.
- To describe the movement of the Moon relative to the Earth.

Working Scientifically Skills

- To identify scientific evidence that has been used to support a theory
- To use simple models to explain scientific ideas.

Linked Units: Autumn 2 – Let's Get Moving	Year	5	Topic	Forces
	<ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction that act between moving surfaces. • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 			

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 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.</p>	<ul style="list-style-type: none"> • Can demonstrate the effect of gravity acting on an unsupported object • Can give examples of friction, water resistance and air resistance • Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance • Can demonstrate how pulleys, levers and gears work
<p>Key vocabulary</p> <p>Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears</p>	
<p>Unit – Let's get Moving</p> <p>Key Words : gravity / weight / Newton / non – contact / Isaac Newton / Galileo / friction / air resistance / water resistance / force meter / reliable / lever / spring / gear / pulley /</p>	
Common misconceptions	

Some children may think:

- the heavier the object the faster it falls, because it has more gravity acting on it
- forces always act in pairs which are equal and opposite
- smooth surfaces have no friction
- objects always travel better on smooth surfaces
- a moving object has a force which is pushing it forwards and it stops when the pushing force wears out
- a non-moving object has no forces acting on it
- heavy objects sink and light objects float.

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

Activities

- Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter.
- 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.
- Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats.
- Explore how levers, pulleys and gears work.
- Make a product that involves a lever, pulley or gear.
- Create a timer that uses gravity to move a ball.
- Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

Possible evidence

- 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
- Can demonstrate clearly the effects of using levers, pulleys and gears

**Switched On Science Unit: Let's Get Moving
Term : Spring 2**

Learning Objectives






- To explain some of the effects of gravity.
- To observe a variety of forces that slow things down.
- To be able to explain how levers, pulleys, springs and gears transfer force and motion.
- To design and make machines that use levers, pulleys, springs and gears..

Working Scientifically Skills

- To plan, carry out and explain fair tests
- To set up, carry out and make sense of a variety of investigations

Year 6

Overview of Topics

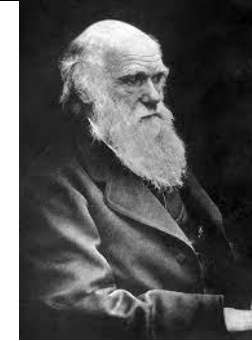
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit	Electrifying	Let It Shine	Classifying Critters		We're Evolving	Staying Alive
NC Programme of Study	<ul style="list-style-type: none"> Electricity 	<ul style="list-style-type: none"> Light 	<ul style="list-style-type: none"> Living Things and their Habitats 		<ul style="list-style-type: none"> Evolution and Inheritance 	<ul style="list-style-type: none"> Animals Including Humans
Sequence of Lessons Extension activities can be used from STEM.org	Lesson 1: Simple Circuits Lesson 2: It's Faulty Lesson 3: Blow! Lesson 4: How Bright? Lesson 5: Games Galore Lesson 6: It's All new	Lesson 1: Straight as an Arrow Lesson 2: The Perfect Silhouette Lesson 3: Mirror Image Lesson 4: Seeing is Believing Lesson 5: Light misbehavior Lesson 6: Rainbows	Lesson 1: Animal, Vegetable or Mineral Lesson 2 : The key to it All Lesson 3: Marvelous Microbes Lesson 4: Fabulous Fungi Lesson 5 : Vegetation Lesson 6: Carl Linnaeus Lesson 7: Tree ID (TGC)		Lesson 1: You Look Like Your Dad Lesson 2: Adaption Lesson 3: How Have they Changed Lesson 4: Natural Selection Lesson 5: All Change	Lesson 1: Is Your Heart In It Lesson 2: Lub Dub Lesson 3: Heart Dissection Lesson 4: Out of Puff Lesson 5 : Race Against Time Lesson 6: What is a Drug Lesson 7: The Importance of Diet
Curriculum Enrichment			<ul style="list-style-type: none"> The Garden Classroom – Tree ID Science Fair 		<ul style="list-style-type: none"> London Zoo 	
Inspirational Scientists	<i>Thomas Edison</i> <i>inventor</i> 	<i>Professor Colin Webb</i> <i>Professor of Laser Physics</i> 	<i>Carl Linnaeus</i> <i>Botanist, zoologist, taxonomist, and physician</i> 		<i>Telma G. Laurentino</i> <i>Evolutionary Biologist</i> 	<i>Ntombizodwa Makuyana</i> <i>Immunologist</i> 
		<i>Delphine Lebrun</i> <i>Material Scientist</i>	Women in Science Day		<i>Charles Darwin</i> <i>Biologist</i>	<i>Michelle Williams</i> <i>Radiologist</i>



Mariastefania De Vido
Laser Scientist



Rosalind Franklin
Scientist (Discovering DNA)



Linked Units: Spring 2 – Classifying Critters	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. 			

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 Can give examples of flowering and non-flowering plants
<p>Key vocabulary</p> <p>Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering</p> <p>Unit – Classifying Critters Key Words: Flora, fauna, vertebrate, invertebrate, insect, mammal, bird, amphibian, reptile, fish, fungi, mushroom, toadstool, fermentation, microbe, bacteria, species, genus, organism</p>	
Common misconceptions	
<p>Some children may think:</p> <ul style="list-style-type: none"> all micro-organisms are harmful mushrooms are plants. 	
Apply knowledge in familiar related contexts, including a range of enquiries	
Activities	Possible evidence

<ul style="list-style-type: none"> • Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. • Use first-hand observation to identify characteristics shared by the animals in a group. • Use secondary sources to research the characteristics of animals that belong to a group. • Use information about the characteristics of an unknown animal or plant to assign it to a group. • Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys. • Create an imaginary animal which has features from one or more groups. 	<ul style="list-style-type: none"> • Can use classification materials to identify unknown plants and animals • Can create classification keys for plants and animals • Can give a number of characteristics that explain why an animal belongs to a particular group
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Switched On Science Unit: Classifying Critters
Term : Spring 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To understand how living things can be classified into groups scientifically. • To know the difference between vertebrates and invertebrates. • To observe similarities and differences and use them to classify living things. • To know that fungi are one of the five kingdoms of living things. • To find out what yeast needs to live. • That moulds are a type of fungi, as is yeast. • That microbes and fungi can be helpful and harmful. • To explore the reasons for a classification system. • To recognise that there are more than two kingdoms. • To investigate ways in which plants can be classified 	<ul style="list-style-type: none"> • To decide on the best way to present evidence • To interpret observations and use them to develop explanations. •

Linked Units: Summer 2 – Staying Alive	Year	6	Topic	Animals, including humans
	<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans. 			

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"> statutory guidance on Physical health and mental wellbeing (primary and secondary). 	<ul style="list-style-type: none"> Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart
Key vocabulary	
<p>Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle</p> <p>Unit – Staying Alive Key Words: Heart, lung, blood, oxygen vein, artery, exercise, nicotine, addiction</p>	
Common misconceptions	

Some children may think:

- your heart is on the left side of your chest
- the heart makes blood
- the blood travels in one loop from the heart to the lungs and around the body
- when we exercise, our heart beats faster to work the muscles more
- some blood in our bodies is blue and some blood is red
- we just eat food for energy
- all fat is bad for you

- all dairy is good for you
- protein is good for you, so you can eat as much as you want
- foods only contain fat if you can see it
- all drugs are bad for you.

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

Activities

- Create a role play model for the circulatory system.
- Carry out a range of pulse rate investigations:
 - 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.
- 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.

Possible evidence

- Use the role play model to explain the main parts of the circulatory system and their role
- Can use subject knowledge about the heart whilst writing conclusions for investigations
- Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body
- Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body

**Switched On Science Unit: Staying Alive
Term : Summer 2**

Learning Objectives

- To recognise the parts of the circulatory system.
- To understand the function of some of the parts of the circulatory system.
- To understand the need for a healthy balanced diet.
- To investigate some effects of exercise on the body.

Working Scientifically Skills

- To take and record measurements.
- To present data in appropriate ways.
- To use evidence to support or refute an assertion.

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| <ul style="list-style-type: none">• To understand the need for a healthy balanced diet.• To explain the effect of drugs on the body.• To analyse data and suggest how it supports ideas about a healthy diet and lifestyle. | |
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Linked Units: Summer 1 – We're Evolving	Year	6	Topic	Evolution and inheritance
	<ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			

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 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"> • Can explain the process of evolution • Can give examples of how plants and animals are suited to an environment • Can give examples of how an animal or plant has evolved over time e.g. penguin, peppered moth • Give examples of living things that lived millions of years ago and the fossil evidence we have to support this • Can give examples of fossil evidence that can be used to support the theory of evolution
Key vocabulary	
<p>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</p> <p>Unit – We're Evolving Key Words: variety, inherited, evolution, adaption. Natural selection, fossil, dinosaur, prehistoric</p>	
Common misconceptions	

Some children may think:

- 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
- offspring most resemble their parents of the same sex, so that sons look like fathers
- all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited
- cavemen and dinosaurs were alive at the same time.

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

Activities

- Design a new plant or animal to live in a particular habitat.
- Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity.
- Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution.
- Make observations of fossils to identify living things that lived on Earth millions of years ago.
- 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.
- Compare the ideas of Charles Darwin and Alfred Wallace on evolution.
- Research the work of Mary Anning and how this provided evidence of evolution.

Possible evidence

- Can identify characteristics that will make a plant or animal suited or not suited to a particular habitat
- Can link the patterns seen in the model to real examples
- Can explain why the dominant colour of the peppered moth changed over a very short period of time

**Switched On Science Unit: We're Evolving
Term : Summer 1**

Learning Objectives

- To understand that although we are similar in many ways, there are also differences between people.
- To recognise that those differences include eye colour, hair colour, height and shoe size.
- To recognise that offspring resemble their parents in many features.
- To recognise that we inherit characteristics from our parents.
- To recognise that offspring are different from each other and their parents.
- To understand that animals best suited to their environment survive to breed and pass on their characteristics to their offspring.
- To recognise that this process is known as natural selection.
- To understand that living things can change over time.
- To recognise that fossils provide information about some of those changes.
- To know about the life and work of scientists who discover fossils.

Working Scientifically Skills

- To collect and present data in a variety of ways.
- To develop research skills and interpret data.
- To recognise that observations can be used to support ideas.
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- To explore ideas about evolutionary timescales.

Linked Units: Autumn 2 – Let There Be Light	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. 			

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	
Unit – Let There Be Light Key Words: light ray, cornea, pupil, iris, lens, reflection, symmetry, rainbow	
Common misconceptions	
Some children may think:	
<ul style="list-style-type: none"> 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

<ul style="list-style-type: none"> • 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. • Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets. 	<ul style="list-style-type: none"> • Can explain how evidence from enquiries shows that light travels in straight lines • 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 • Can predict and explain, with diagrams or models as appropriate, how the shape of shadows can be varied
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Switched On Science Unit: Let There Be Light
Term : Autumn 2

Learning Objectives	Working Scientifically Skills
<ul style="list-style-type: none"> • To recognise that light appears to travel in straight lines. • To explain how a shadow is formed. • To explore how to change the size of a shadow. • To apply the idea of how light travels to explain how we see things. • To explore how light behaves at reflective surfaces. • To explore how light can be reflected and bent in various ways. • To explore how white light can be split up. • To recognise that light is made up of more than one colour. 	<ul style="list-style-type: none"> • To represent and report on findings. • To take accurate measurements. • To identify and manage variables in an investigation • To present findings and conclusions from experiments. • To use secondary sources to answer questions • To make observations and raise further questions to investigate

Linked Units: Autumn 1 – Electrifying	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. 			

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>Key vocabulary</p> <p>Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage</p> <p>Unit – Electrifying Key Words: component, cell, complete, electrons, fuse, blow, filament, battery, renewable, solar</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	

Some children may think:

- larger-sized batteries make bulbs brighter
- a complete circuit uses up electricity
- components in a circuit that are closer to the battery get more electricity.

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

Activities

- 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.
- Make circuits to solve particular problems, such as a quiet and a loud burglar alarm.
- Carry out fair tests exploring changes in circuits.
- Make circuits that can be controlled as part of a DT project.

Possible evidence

- Can incorporate a switch into a circuit to turn it on and off
- Can change cells and components in a circuit to achieve a specific effect
- Can communicate structures of circuits using circuit diagrams with recognised symbols
- Can devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test
- Can predict results and answer questions by drawing on evidence gathered

**Switched On Science Unit: Electrifying
Term : Autumn 1**

Learning Objectives

- To recall circuit symbols for a cell, battery, switch, motor and buzzer.
- To construct simple circuits using bulbs, motors, buzzers and switches.
- To recognise and explain what is needed for a circuit to work.
- To recognise from a diagram whether a circuit will work.
- To represent circuits with symbols.
- To change components in a circuit and explain the patterns of change produced.
- To design and build a circuit that matches a design brief.
- To explain how the circuit works in detail.
- To represent circuits scientifically.
- To consider the impact of various ways of making electricity on the environment.
- To consider alternative forms of electricity production.

Working Scientifically Skills

- To present findings and conclusions.
- To plan how to investigate an idea by managing variables.
- To use results to make predictions and suggest further tests to conduct.