

Our Science Intent

Our Science curriculum is based on the National curriculum and will take our pupils on a journey of discovery about the world around them. We aim to promote curiosity and build knowledge and understanding through scientific enquiry and engaging big questions. The specific disciplines of biology, physics and chemistry underpin our curriculum design and pupils will develop their scientific knowledge and conceptual understanding to make sense of the scientific world we live in. Working scientifically is integral to our science curriculum design and is embedded within each unit. This ensures pupils use a range of skills in their scientific enquiries to become inspired and confident scientists.

Our Science Implementation

We use the Science Bug feature of Active Learn to support our planning, preparation and resourcing of high quality science lessons.

Science is taught discreetly each week for a minimum of one hour in KS1 and two hours in KS2.

Each year group has a science topic each half term totalling 6 units per year group. This units can be moved around by the class teacher to fit in with the seasonal time of year or to match POR books or topics in other subject areas.

Each unit includes knowledge based objectives and also some working scientifically skills to be included.

Each unit must include at least one scientific enquiry, but every opportunity is taken for science to be hands-on, practical or outdoors.

Each unit has a linked scientist, a challenge question, key vocabulary and skills.

An opportunity for writing is provided each term.

Science will be promoted through display, Science weeks, visiting scientists, science shows and opportunities to share learning e.g. through assemblies.

Christ Church Scientists will ...

Talk of a love of science

Know how science can be seen in everyday life and talk about why things behave as they do.

Write enthusiastically using the subject knowledge they have acquired

Plan, carry out, record results and come to conclusions about scientific enquiries that they have carried out.

Ask questions to further their scientific understanding

Research answers to their scientific questions

Observe accurately and measure efficiently to ensure that the results that they achieve can be relied upon

Be eager to go to high school and learn more science to further their knowledge and understanding

Have aspirations to follow a career which is underpinned by scientific knowledge and understanding.

Nursery			
Term	Knowledge	Skills	Vocabulary
Autumn Senses	Use all their senses in hands-on exploration of natural materials	Observing and exploring collections of materials with similar and/or different properties using their senses. Questioning what they observe and talk about what they can see using why vocabulary.	Hear, see, taste, touch, feel, autumn, hedgehog, different, same, wood, mud, grass, plant, tree, leaves, night, day, stars, moon
Spring Plants/minibeasts	Plant seeds and care for growing plants Understand the key features of the life cycle of a plant and an animal Begin to understand the need to respect and care for the natural environment and all living things.	Observing and questioning what plants need to survive. Make observations and draw pictures of animals and plants.	Seed, soil, root, water, light, warmth, life cycle, minibeasts, flower.
Summer Materials	Talk about the differences between materials and changes they notice Explore and talk about different forces they can feel.	Talk about and describe pushes and pulls. Explore how things work.	Material, strength, weak, brick, straw, sticks, break, summer, sunny, sea, names of farm animals.

Reception			
Term	Knowledge	Skills	Vocabulary
Autumn	Use all their senses in hands-on exploration of natural materials.	Observing and describe using their senses. Questioning what they observe, discover.	Hear, see, taste, touch, feel, autumn, hedgehog,

<p>All about me</p> <p>Light/Space</p>	<p>To explore the world around them.</p> <p>Describe what they see, feel, and hear whilst outside</p>	<p>Recognise some environments are different to their own.</p>	<p>hibernate, environment, different, similar, same, compare, wood, mud, grass, plant, tree, leaves, night, day, stars, moon</p>
<p>Spring</p> <p>Water freezing</p> <p>Who can I ask for help?</p>	<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Understand and explore the natural world around them.</p>	<p>Observing and questioning what plants need to survive.</p> <p>Make observations and draw pictures of animals and plants.</p>	<p>Seed, soil, root, water, light, warmth, observe, sapling, life cycle, minibeasts, flower.</p>
<p>Summer</p> <p>Do all stories have a happy ending?</p> <p>Would you like to live by the sea?</p>	<p>Talk about the differences between materials and changes they notice.</p> <p>To recognise that some environments are different to the ones in which they live.</p> <p>To understand some important processes and changes in the natural world around them including the seasons.</p>	<p>Make observations and draw pictures of animals.</p>	<p>Material, strength, weak, brick, straw, sticks, break, summer, sunny, sea, tide, names of zoo animals, habitat, environment.</p>

Year 1 Scientist – Mary Seacole and Florence Nightingale
Year 1/2 scientist – Mae Jemison

Year 1 Genre – Labels and explanation sentences.

Year 1 – Autumn 1 – Parts of Animal – How Similar am I to a tiger?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) 	Observing closely, using simple equipment Performing simple tests Identifying and classifying	Senses – ear, eye, nose, mouth, taste, touch, feel, hear, see, mammals, fish, birds, amphibians, reptiles, fin, wing beak, tail, trunk, babies, eggs.	Classifying animals into groups according to similar characteristics by observing photographs closely and using magnifying glasses.

Year 1 – Autumn 2 – Changing Seasons – How does the weather report change with each season?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	Observing closely, using simple equipment Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions. Asking simple questions and recognising that they can be answered in different ways	Winter, summer, spring, autumn, months of the year, snow, mist, wind, clouds, rain, warm, hot, cold, freeze, snow, hail, sunset, sunrise, dawn, dusk.	Weather monitors set up to record weather and seasons and observe changes over time, including a rain collection. This unit should be revisited each term so pupils can see the seasonal changes over time.

Year 1 – Spring 1 – Identifying Materials – Which object is also a material?

Knowledge	Skills	Vocabulary	Scientific enquiry
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<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 	<p>Observing closely, using simple equipment Identifying and classifying Performing simple tests Asking simple questions and recognising that they can be answered in different ways Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions.</p>	<p>Plastic, wood, rubber, glass, metal, rock, material, object, hard, bendy, transparent, waterproof, identify, observe.</p>	<p>How can we sort these materials? Identify the material of objects and sort them according to properties using a venn diagram.</p>
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Year 1 – Spring 2 – Types of animals – Would a carnivore eat a herbivore?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	<p>Observing closely, using simple equipment Identifying and classifying Gathering and recording data to help in answering questions.</p>	<p>Fish, amphibians, reptiles, birds, mammals, eggs, babies, cold-bloodied, warm-bloodied, water, habitats, carnivores, herbivores, omnivores, meat, plants</p>	<p>How can we sort these animals? Identify animals and what they eat and classify them into categories. Compare two different animals and record similarities and differences.</p>

Year 1 – Summer 1 – Plants – Are roots needed for a plant to survive?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<p>Observing closely, using simple equipment</p> <p>Identifying and classifying</p> <p>Gathering and recording data to help in answering questions.</p>	<p>Oak tree, school class tree names, daffodils, dandelions, bluebells, roses, tulips, lillies.</p> <p>Roots, leaves, stem, flower, trunk, branches.</p>	<p>Nature walk – Identifying and recording how many different types of plants and trees can be found in the school environment?</p>

Year 1 – Summer 2 – Comparing Materials – Glass would be a good choice to make a shelter – agree or disagree?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> 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. 	<p>Observing closely, using simple equipment</p> <p>Identifying and classifying</p> <p>Asking simple questions and recognising that they can be answered in different ways</p> <p>Using their observations and ideas to suggest answers to questions</p> <p>Gathering and recording data to help in answering questions.</p> <p>Performing simple tests</p>	<p>Hard, soft, bendy, rigid, waterproof, flexible, transparent, opaque, similar, different.</p>	<p>Pupils investigate whether materials are bendy or rigid and group them accordingly.</p> <p>They then choose their own properties to group materials on.</p> <p>Choosing properties for shelters.</p>

By the end of year 1 pupils will...

Be able to name parts of animals, group and classify animals and what they eat. They will know the seasons and be able to describe the weather for each season. They will be able to identify key materials and some of their properties and understand the basic structure of a plant and name some common plants and trees.

Year 2 Scientist – Chris Packham
Year 2 genre – Non-chronological reports

Year 2 – Autumn 1 – Living Things – How do you know you're alive?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive Notice that animals, including humans, have offspring which grow into adults 	Identifying and classifying Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions. Observing closely, using simple equipment	Living, alive, dead, non-living, movement, respiration, sensitivity, growth, reproduction, excretion, nutrition, animal, human, bay, offspring.	Identifying groups of living and non-living things then classifying them into groups.

Year 2 – Autumn 2 – Feeding and Exercise – Which is more important for your health, eating well or exercise?

Knowledge	Skills	Vocabulary	Scientific enquiry
Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 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. Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identifying and classifying Performing simple tests Gathering and recording data to help in answering questions.	Survival, water, food, hydration, air, oxygen, breathing, pulse, heart rate, food chain, source, plant, meat, carnivore, herbivore, omnivore, primary consumer, secondary consumer, exercise, hygiene	Which type of exercise raises our pulse most? Pupils perform different exercises and record breaths in/pulse to decide which exercise tires them out the most.

Year 2 – Spring 1– Habitats – Could a mammal survive in a water habitat?			
Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> 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 	Identifying and classifying Gathering and recording data to help in answering questions. Observing closely, using simple equipment Asking simple questions and recognising that they can be answered in different ways	Habitat, micro-habitat, shelter, food, water, oxygen, warmth, safety, ocean, woodland, coast line, urban, suited, suitability	Nature walk in local woodland/school forest area. Record minibeasts found in the habitat and create own micro-habitat and then record animals found there over a period of time.

Year 2 – Spring 2– Use of materials – Why are windows made of glass?			
Knowledge	Skills	Vocabulary	Scientific enquiry
<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 	Identifying and classifying Asking simple questions and recognising that they can be answered in different ways Observing closely, using simple equipment Performing simple tests Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions.	Wood, metal, plastic, glass, brick, rock, paper, cardboard, hard, soft, rigid, smooth, bumpy, shiny, dull, transparent, opaque, waterproof, absorbent, suitability.	Which materials are waterproof? Testing different materials with water droplets to test whether they are waterproof or not.

Year 2 – Summer 1 – Changing Shape – Can all solid objects be changed?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	Identifying and classifying Asking simple questions and recognising that they can be answered in different ways Observing closely, using simple equipment Performing simple tests Gathering and recording data to help in answering questions.	Squashing, bending, twisting, stretching, material, property, solid,	Which material can be stretched the most before it breaks? Use different materials and measure them after stretching. Group materials according to how their shape can be changed.

Year 2 – Summer 2 - Growing Plants – Could we grow our own lunch?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	Using their observations and ideas to suggest answers to questions Observing closely, using simple equipment Asking simple questions and recognising that they can be answered in different ways Performing simple tests	Soil, seedling, sapling, shoot, leaf, root, water, light, warmth, suitable, temperature	Plant cress seeds and investigate which seeds and conditions lead to the most growth.

By the end of year 2 pupils will...

Know the seven life processes and that healthy food, exercise and hygiene are important if life. They will understand what lives where be able to describe several habitats. They will know the properties of lots of materials, the suitability of materials and how materials can be changed shapes. They will also know what plants need to stay alive.

Be able to identify and classify in lots of different ways and begin to think about investigating fairly whilst recording their results and concluding.

Year 3 Genre – Newspaper Reports

Year 3 – Autumn 1 – Movement and Feeding - What if we woke up and had no skeleton?

Scientist – Leonardo Di Vinci

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>Asking relevant questions and using different types of scientific enquiries to answer them</p> <p>Setting up simple practical enquiries, comparative and fair tests</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Using straightforward scientific evidence to answer questions or to support their findings</p>	<p>Nutrition</p> <p>Carbohydrates</p> <p>Proteins</p> <p>Vitamins</p> <p>Minerals</p> <p>Dairy</p> <p>Fruit</p> <p>Vegetables</p> <p>Skeleton</p> <p>Muscle</p> <p>Relax</p> <p>Contract</p> <p>Fats</p> <p>Sugars</p> <p>Exercise</p> <p>Heartbeat</p> <p>Respiration</p> <p>Oxygen pulse</p>	<p>Investigating healthy foods and developing a balanced meal.</p> <p>Enquiry about how exercise affects heart rate and concluding about why this is.</p>

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Year 3 – Autumn 2 – Light and Shadows – Can you have shadows without light?			
Knowledge	Skills	Vocabulary	Scientific enquiry
<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 shadows are formed when the light from a light source is blocked by a solid object Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Find patterns in the way that the size of shadows change 	Setting up simple practical enquiries, comparative and fair tests Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Making systematic and careful observations. Using results to draw simple conclusions, make predictions.	Light Dark Reflection Shadow Light sources Solid Sunlight UV rays pattern	Which material is the most reflective? Using different materials and mirrors. How does distance from light source affect shadow length?

Year 3 – Spring 1 – Rocks and Soils – Can a statue last for 1000 years?			
Scientist – Mary Anning			
Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties 	Making systematic and careful observations and, where appropriate, taking accurate measurements.	Fossils Soils Chalk Granite	Testing rocks for permeability, density and durability.

<ul style="list-style-type: none"> 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. 	<p>Setting up simple practical enquiries, comparative and fair tests</p>	<p>Limestone Basalt Quartz Slate Marble Obsidian Pumice Sedimentary Metamorphic Igneous Porous Permeable Durability Density Humus Topsoil</p>	<p>Making predictions and careful observations.</p>
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Year 3 – Spring 2 – Forces and Magnets – Can something move without anything touching it?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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 Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing. Observe how magnets attract or repel each other and attract some materials and not others 	<p>Making systematic and careful observations. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Setting up simple practical enquiries, comparative and fair tests Using results to draw simple conclusions, make predictions.</p>	<p>Forces Magnets Magnetic force Poles – north and south Attract Repel Magnetic Metal Friction Surface area Rough smooth</p>	<p>How does the amount of friction affect the distance travelled? What materials are magnetic? Does magnetic force go through different materials.</p>

<ul style="list-style-type: none"> 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 	<p>Identifying differences, similarities or changes related to simple scientific ideas and processes Asking relevant questions and using different types of scientific enquiries to answer them</p>		
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Year 3 – Summer 1 – Plants and their parts – Which part of a plant is most important to its survival?

Scientist – Jane Colden

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>Asking relevant questions and using different types of scientific enquiries to answer them Making systematic and careful observations and, where appropriate, taking accurate measurements. Gathering, recording, classifying and presenting data in a variety of ways. Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Roots Stem Trunk Leaves Flower Water Transportation Life cycle Pollen Pollination Seed formation Seed dispersal</p>	<p>How does temperature affect water transportation?</p>

Year 3 – Summer 2 – Plants and what they need – What do plants need to survive?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> 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 	<p>Gathering, recording, classifying and presenting data in a variety of ways.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements.</p> <p>Using results to draw simple conclusions, make predictions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>Setting up simple practical enquiries, comparative and fair tests</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Reporting on findings from enquiries.</p>	<p>Air</p> <p>Oxygen</p> <p>Carbon dioxide</p> <p>Light</p> <p>Water</p> <p>Nutrients</p> <p>Soil</p> <p>Respiration</p>	<p>What do plants need to grow and survive?</p>

By the end of year 3 pupils will...

Know the importance of nutrition, skeletons and muscles. They will understand light, how it reflects off surfaces and how shadows are created and varied. They will know different and compare rocks, understand how fossils are formed and how soils are made. They will understand what a force is, describe magnets and how they work and what materials are attracted to magnets. They will know the key parts of plants, what they need to survive, how this varies and understand the life cycle of a plant.

Year 4 Genre – Diary Entries

Year 4 – Autumn 1 – Electricity – What if there was no electricity this morning?

Scientist – Thomas Edison

Knowledge	Skills	Vocabulary	Scientific enquiry
<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 some common conductors and insulators, and associate metals with being good conductors. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit 	<p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Using straightforward scientific evidence.</p> <p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes</p>	<p>Electrical circuit</p> <p>Cells</p> <p>Wires</p> <p>Bulbs</p> <p>Switches</p> <p>Buzzer</p> <p>Series circuit</p> <p>Conductors</p> <p>Insulators</p> <p>Metals</p> <p>Switch</p> <p>Appliances</p> <p>Battery</p> <p>Turbines</p> <p>Geothermal</p>	<p>How does the number of wires affect the brightness of a bulb?</p> <p>What materials are conductors and which are insulators?</p>

Year 4 – Autumn 2 – Teeth, digestion and food – How do you get from chew to poo?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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 	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p>	<p>Nutrition</p> <p>Digestion</p> <p>Decay</p> <p>Function</p> <p>Molar</p> <p>Canine</p> <p>Incisor</p> <p>Oesophagus</p>	<p>How do different drinks affect our teeth?</p> <p>Affect of sugar on eggshells as a representation of human teeth.</p>

humans and their simple functions	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	Bile duct rectum Stomach Small intestine Large Intestine Digestive system	
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Year 4 – Spring 1 – Changing State – Is Water always a liquid?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	Identifying differences, similarities or changes related to simple scientific ideas and processes Setting up simple practical enquiries, comparative and fair tests Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Solid Liquid Gas Particles States of matter Temperature Heated Cooled Degrees Celsius Melting Freezing Evaporation Condensation Water cycle Thermometer	Does temperature affect the rate of evaporation? Water left at different temperatures in containers and rate of evaporation is tested.

Year 4 – Spring 2 – Sound – Could we have a moon disco?

Scientist – Alexander Graham Bell			
Knowledge	Skills	Vocabulary	Scientific enquiry
<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 	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Setting up simple practical enquiries, comparative and fair tests Identifying differences, similarities or changes related to simple scientific ideas and processes	Vibrations Pitch Airwaves Pattern Volume Fainter Distance Sound source Tuning fork Vacuum Ear drum Ear canal Malleus (hammer) Incus (anvil) Stapes (stirrup) Auditory nerve Cochlea	How can we alter the pitch of sound? Using different volumes of water to see how this affects pitch of sound. Which material absorbs sound the best? Make their own ear defenders. How does sound travel over distance?

Year 4 – Summer 1 – Grouping Living Things – Why is a rabbit not a reptile?			
Knowledge	Skills	Vocabulary	Scientific enquiry
<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 	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Classification key Species Location British Isles Habitat Environment Vertebrate	Classifying animals using a classification key. Classifying living things found in locations in the school grounds.

group, identify and name a variety of living things in their local and wider environment.	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using straightforward scientific evidence to answer questions or to support their findings	Invertebrate Reptile Mammal Bird Fish Amphibian	
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Year 4 – Summer 2 – Dangers to Living Things – What is the biggest threat to living things?

Scientist – David Attenborough

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey. 	Asking relevant questions and using different types of scientific enquiries to answer them Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Setting up simple practical enquiries, comparative and fair tests Using straightforward scientific evidence to answer questions or to support their findings.	Producer Consumer Predator Prey Food change Environmental changes Vegetarian Herbivore Carnivore omnivore	Gather information and present it on a particular species and dangers it is facing.

By the end of year 4 pupils will...

Understand what needs electricity and how circuits work. They will also investigate what conducts electricity and how switches work. Pupils will know the function and how the digestive system works and will be able to identify teeth and their function. They will group solids, liquids and gases, understand how matter changes state and evaporation and condensation and how these are affected by temperature. Year 4 pupils will understand sound and how it travels, identify ear parts and investigate pitch and volume of sound.

Pupils will be able to group living things and use classifications keys, identify dangers to living things and understand and construct food chains.

Year 5 Genre - Biographies

Year 5 – Autumn 1 – Earth and Space – What if the Earth stopped spinning?

Scientist – Tim Peake

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Describe the Sun, Earth and Moon as approximately spherical bodies Describe the movement of the Earth, and other planets, relative to the Sun in the solar system Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Describe the movement of the Moon relative to the Earth 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Using test results to make predictions to set up further comparative and fair tests</p>	<p>Spherical bodies</p> <p>Solar system</p> <p>Axis</p> <p>Rotation</p> <p>Orbit</p> <p>Gravity</p> <p>Planet names</p> <p>Sun</p> <p>Moon</p>	

Year 5 – Autumn 2 – Separating mixtures – If you mix 2 things together can they always be separated?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>	<p>Solid</p> <p>Liquid</p> <p>Gas</p> <p>Mixture</p> <p>Separation</p> <p>Filtering</p>	<p>How can a mixture of salt, sand and pasta be separated?</p> <p>Filtering of different solutions.</p>

<p>sieving and evaporating</p> <ul style="list-style-type: none"> Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution 	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Identifying scientific evidence that has been used to support or refute ideas or argument</p>	<p>Sieving Evaporating Dissolve Solution Substance Solvent Solute</p>	
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Year 5 – Spring 1 – Forces – Is gravity the greatest force of them all?

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>	<p>Gravity Gravitational pull Air resistance Water resistance streamlining Friction Surfaces Mechanisms Levers Pulleys Gears Grip Force meters</p>	<p>How does surface area affect air resistance?</p>

Year 5– Spring 2 – Life Cycles – What if life wasn't a cycle?			
Scientist – Jane Goodall			
Knowledge	Skills	Vocabulary	Scientific enquiry
<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 changes as humans develop to old age. Describe the life process of reproduction in some plants and animals. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p>Mammal</p> <p>Amphibian</p> <p>Warm-blooded</p> <p>Cold-blooded</p> <p>Bird</p> <p>Eggs</p> <p>Reproduction</p> <p>Germination</p> <p>Pollination</p> <p>Seed dispersal</p> <p>Metamorphosis</p> <p>Species</p> <p>Survival</p> <p>Offspring</p> <p>Gestation</p> <p>Gestation period</p>	

Year 5 – Summer 1 – Materials – Why can spoons be metal, plastic or wooden?			
Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>	<p>Materials</p> <p>Properties</p> <p>Hardness</p> <p>Solubility</p> <p>Transparency</p> <p>Conductivity</p> <p>Electrical</p>	<p>What materials insulate heat the best?</p> <p>What materials conduct electricity the best?</p>

<p>(electrical and thermal), and response to magnets</p> <ul style="list-style-type: none"> Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Using test results to make predictions to set up further comparative and fair tests</p>	<p>Thermal Comparative Conductor Insulator Polystyrene Ceramic</p>	
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Year 5 – Summer 2 – Types of change – ?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> 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. 	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments. Using test results to make predictions to set up further comparative and fair tests Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>	<p>Dissolving Mixing Change of state Reversible change Irreversible change Solute Solvent Bicarbonate Soda Acid Evaporation</p>	<p>What changes are irreversible? Children investigate reversible and irreversible changes using heat.</p>

By the end of year 5 pupils will...

Understand the sun, moon and planets are spherical bodies, that planets rotate on axis and how this creates night and day and how planets orbit the sun and the moon orbits the Earth. They will know how states of matter can be separated through sieving, filtering and evaporation and how substances can be dissolved and then recovered from a solution. Pupils will also know about forces and in particular gravity, air resistance and water resistance and also different things which affect them e.g. surface area. They will also understand life cycles of animals and plants and the process of reproduction.

They will extend their knowledge of materials to include properties such as transparency and solubility, whilst testing materials and giving reasons for why they are selected for particular reasons. Finally, they will extend their knowledge of dissolving, mixing and reversible and irreversible changes of state and how new materials can be formed.

Year 6 Genre – Explanation

Year 6 – Autumn 1 – Electricity and changing circuits – Do all appliances need the same amount of electricity?

Scientist – Nikola Tesla

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Use recognised symbols when representing a simple circuit in a diagram. 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 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p>Symbols</p> <p>Circuit</p> <p>Diagram</p> <p>Brightness</p> <p>Bulb</p> <p>Lamp</p> <p>Buzzer</p> <p>Voltage</p> <p>Cells</p> <p>Components</p> <p>Battery</p> <p>Wire</p> <p>Conductor</p> <p>Insulator</p>	<p>How is the brightness of a lamp/volume of a buzzer affected by number/voltage of cells used in a circuit?</p>

the on/off position of switches			
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Year 6 – Autumn 2 – Light and Sight – Why do shadows have the same shape as the objects that cast them?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> 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 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 Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p>Light source</p> <p>Reflection</p> <p>Shadow</p> <p>Reflective</p> <p>Periscope</p> <p>Observation</p>	<p>What is refraction?</p> <p>Does light travel in straight lines?</p> <p>How can we see round corners?</p>

Year 6 – Spring – Our bodies – How does the heart circulate blood around the body?

Scientist – Christiaan Barnard

Knowledge	Skills	Vocabulary	Scientific enquiry
<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 Describe the ways in which nutrients and water are 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p>Circulatory System</p> <p>Heart</p> <p>Blood vessel</p> <p>Vein</p> <p>Artery</p> <p>Capillary</p> <p>Oxygen</p> <p>Oxygenated blood</p>	<p>How does exercise affect your heart rate? Why does heart rate have to increase during exercise?</p>

<p>transported within animals, including humans.</p> <ul style="list-style-type: none"> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function 	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>	<p>Deoxygenated blood Aorta Pulmonary Nutrients Exercise Blood flow Drugs Medication Antibiotics</p>	
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Year 6 – Summer 1 – Evolution and Inheritance – Is it fair to say as dead as a dodo?

Scientist – Charles Darwin

Knowledge	Skills	Vocabulary	Scientific enquiry
<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. 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentation</p>	<p>Fossils Evolution Offspring DNA Chromosomes Adaptation Inheritance Natural selection Selective breeding</p>	<p>How have animals evolved over time or adapted to suit their environment? (Finches)</p> <p>Use secondary reliable sources and produce presentations.</p>

Year 6 – Summer 2 – Classifying Living Things – Micro-organisms: Friend or Foe?

Knowledge	Skills	Vocabulary	Scientific enquiry
<ul style="list-style-type: none"> Describe how living things are classified into 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Classification Characteristics</p>	<p>Is yeast a living micro-organism?</p>

<p>broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <ul style="list-style-type: none"> • Give reasons for classifying plants and animals based on specific characteristics. 	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Using test results to make predictions to set up further comparative and fair tests</p>	<p>Similarities Differences Micro-organisms Mould Moisture Observable Species Decomposition</p>	
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By the end of year 6 pupils will...

Be able to work scientifically in a number of different ways and plan and carry out a fair test; collecting data accurately and drawing scientific conclusions. They will be able to use a range of scientific equipment correctly in order to provide accurate data which they can present in a variety of different ways.

They will understand electricity and how the brightness or volume can be affected by cells or voltage and can represent this as a circuit diagram. They will also be able to talk about variations in circuits and know how switches work.

Pupils will understand that light travels in straight lines from a light source to the eye and that objects are seen because they give out or reflect light and understand that because of all this shadows cast the same shape as the object blocking the light.

They will know the main parts of the circulatory system and their function and the impact of diet, lifestyle, drugs and exercise on health and a healthy heart.

They will understand that living things have adapted and evolved over time and fossils provide evidence of this from millions of years ago. Also, they will know that living things produce offspring and that these vary and that animals/plants have adapted to suit their environment which can lead to evolution. Finally, they will be able to describe how living things are classified according to observable similarities and differences and will be able to justify their reasons for classifying based on specific characteristics.