'Shine like stars in the world. 'Philippians 2:15

St Paul's Church of England Primary School

Science
Long Term Curriculum 2021

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Science Long Term Curriculum 2021/2022

Modules are taught in the order shown throughout the year and are not organised by half-term as the content for each module varies in length.	Year	National Curriculum Topics and Snap Science Modules	Our Changing World Units - regularly slotted in throughout the year
	R	**Light, Space, Electricity and Movement (6)** **Objects and Materials (6)** **Animals and Plants (6)**	**Our changing world: The Local Environment (6)**
Autumn **Spring** **Summer**	Y1	**Seasonal Changes-*OCW: Sensing Seasons (5)*** **Everyday Materials-*Everyday materials (10)*** **Animals, including humans-*Looking at animals (7)*** **-*Using our senses (6)*** **Plants-*Plant detectives (5)*** ***Working scientifically taught throughout***	**Our changing world: Plants (5)** **Our changing world: Animal antics (3)**
Autumn **Spring** **Summer**	Y2	**Uses of everyday materials-*Materials: Good choices (8)*** **-*Materials: Shaping up (6)*** **Living things and their habitats-*What is in your habitat? (3)*** **Animals, including humans-*Take care (4)*** **-*Growing up (4)*** **Plants-*The apprentice gardener (10)*** ***Working scientifically taught throughout***	**Our changing world: (7)**
Autumn **Spring** **Summer**	Y3	**Plants-*How does your garden grow? (12)*** **Light-*Can you see me? (9)*** **Forces and magnets-*The power of forces (7)*** **Rocks-*Rock detectives (10)*** **Animals, including humans-*Amazing bodies (8)*** ***Working scientifically taught throughout***	**Our changing world: (8)**
Autumn **Spring** **Summer**	Y4	**Living things and their habitats-*Human impact (6)*** **-*Who am I? (4)*** **Animals, including humans-*Where does all that food go? (9)*** **States of matter-*In a state (12)*** **Electricity-*Switched on (9)*** **Sound-*Good vibrations (7)*** ***Working scientifically taught throughout***	**Our changing world: (3)**

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Science Long Term Curriculum 2021/2022

Modules are taught in the order shown throughout the year and are not organised by half-term as the content for each module varies in length.	**Year**	**National Curriculum Topics and Snap Science Modules**	**Our Changing World Units - regularly slotted in throughout the year**
Autumn **Spring** **Summer**	**Y5**	**Living things and their habitats-*Circle of life (7)*** **Forces-*Feel the force (10)*** **Animals, including humans-*Reproduction in plants and animals (8)*** **Properties and changes of materials-*Get sorted (6)*** ***-Everyday materials (6)*** **Earth and space-*The earth and beyond (8)*** ***Working scientifically taught throughout***	**Our changing world: (4)**
Autumn **Spring** **Summer**	**Y6**	**Properties and changes of materials-*Marvellous mixtures (5)*** ***-All change! (5)*** **Animals, including humans-*Body pump (7)*** ***-Body health (9)*** **Living things and their habitats-*The nature library (10)*** **Light-*Light up your world (9)*** **Electricity-*Danger! Low voltage (6)*** **Evolution and Inheritance-*Everything changes (10)*** ***Working scientifically taught throughout***	**Our changing world: (5)**

The lessons in the Our Changing World module should not all be taught at one time, but regularly slotted in to each term.

Key:

Green: Biology
Blue: Chemistry
Red: Physics

The coloured title in bold identifies the national curriculum topics e.g. Evolution and Inheritance
The coloured, italic, underlined and bold title identifies the corresponding module on Snap Science e.g. *Everything changes (10)*
The number in the brackets identifies the number of lessons in that module on snap science e.g. *(10)*

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Science Long Term Curriculum 2021/2022

Understanding of the World: EYFS		
Biology **Animals and Plants**	**Chemistry** **Objects and Materials**	**Physics** **Light, Space, Electricity and Movement**
• Children learn about how earthworms move, what they eat and about their habitat through close up, - first hand observation, asking their own questions and collecting evidence to answer them. • Children will think about how an animal's stripes may help to keep them safe in their natural environment. • Children will learn about animals that lay eggs and talk about the baby animals that hatch from them. • children will learn about the different parts of plants and notice their colours. • Children will learn about and name several different animals. children will learn about what different parts of their bodies are called, find out what they can do and think about what they are made of.	• Children will find out how the structure of different homes and the materials used make them suitable for their different inhabitants. • Children investigate hats, the materials they are made from and their different shapes, and make decisions about their suitability for wearing in different weather conditions. • Children will observe first hand materials that melt in everyday situations and compare these to materials that do not melt. They will learn about the role of heat in the melting process. • Children will learn about what happens when they mix different dry and wet materials together. • children investigate how to separate mixtures of different materials and different sized objects. • children will investigate soap bubbles, finding out how to make them and how they behave.	• Children can use appropriate language to talk about what happens at night, including dark, light, the Sun, the Moon and stars. • Children can name and describe a range of living and non-living things that are in the sky. • Children will observe the Moon in real life and, using photographs, notice that its shape appears to change, think about its surface and find out about people and machines that have travelled to the Moon. • Children will investigate how to make things move. • Children compare the different ways that they can make a range of simple mechanical toys move. • children will explore the big physics idea that some objects float on the surface of water and that some objects sink.

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Science Long Term Curriculum 2021/2022

Science: Year 1				
Biology		**Chemistry**		**Physics**
Animals, includingHumans	**Animals, includingHumans**	**Plants**	**Everyday Materials**	**Seasonal Change**
• *Name commonanimals* • *Carnivores, etc*	• *Human bodyand senses*	• *Common plants* • *Plant structure*	• *Properties of materials* • *Grouping materials*	• *The four seasons* • *Seasonal weather*
• Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds • Know and classify animalsby what they eat (carnivore, herbivore and omnivore) • Know how to sort by living and non-livingthings	• Know the name of partsof the human body that canbe seen	• Know and name a varietyof common wild and garden plants • Know and name the petals, stem, leaves and rootof a plant • Know and name the roots, trunk, branchesand leaves of atree	• Know the name of the materials an object is made from • Know about the properties of everyday materials	• Name the seasons and know about the type of weather in each season

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Science Long Term Curriculum 2021/2022

Science: Year 2				
Biology			**Chemistry**	
All living things andtheir habitats	**Animals, including Humans**	**Plants**	**Everyday Materials**	
• *Alive or dead* • *Habitats* • *Adaptations* • *Food chains*	• *Animal reproduction* • *Healthy living* • *Basic needs*	• *Plant and seedgrowth* • *Plant reproduction* • *Keeping plants healthy*	• *Identify different materials* • *Name everyday materials* • *Properties of materials*	• *Compare the use of different materials* • *Compare movement on different surfaces*
• Classify things by living, deador never lived • Know how a specific habitat provides for thebasic needs of things living there (plants and animals) • Match living things to their habitat • Name some different sources of foodfor animals • Know about and explain a simple food chain	• Know the basicstages in a life cycle for animals, (including humans) • Know why exercise, a balanced dietand good hygiene are important for humans	• Know and explain how seeds and bulbsgrow into plants • Know what plants need in order to grow and stay healthy (water,light & suitabletemperature)	• Know how materials canbe changed by squashing, bending, twisting and stretching	• Know why a material might or might not be used for a specific job

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Science Long Term Curriculum 2021/2022

Science: Year 3				
Biology		**Chemistry**	**Physics**	
Animals, includinghumans	**Plants**	**Rocks**	**Forces**	**Light**
• *Skeleton and muscles* • *Nutrition* • *Exercise and health*	• *Plant life* • *Basic structure andfunctions* • *Life cycle* • *Water transportation*	• *Fossil formation* • *Compare and grouprocks* • *Soil*	• *Different Forces* • *Magnets*	• *Reflections* • *Shadows*
• Know about theimportance of anutritious, balanced diet • Know how nutrients, water and oxygen aretransported within animals and humans • Know about theskeletal and muscular systemof a human	• Know the function of different parts offlowering plants and trees • Know how wateris transported within plants • Know the plantlife cycle, especially the importance of flowers	• Compare and group rocks based on their appearance andphysical properties, giving reasons • Know how soil is made and how fossils are formed • Know about andexplain the difference between sedimentary, metamorphic and igneous rock	• Know about anddescribe how objects move ondifferent surfaces • Know how a simple pulley works and use toone to lift an object • Know how someforces require contact and some do not, giving examples • Know about andexplain how magnets attract and repel • Predict whethermagnets will attract or repel and give a reason	• Know that dark isthe absence of light • Know that light isneeded in orderto see and is reflected from asurface • Know and demonstrate howa shadow is formed and explain how a shadow changesshape • Know about thedanger of directsunlight and describe how tokeep protected

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Science Long Term Curriculum 2021/2022

Science: Year 4				
Biology		**Chemistry**	**Physics**	
Animals, including humans	**All living things and their habitats**	**States of Matter**	**Electricity**	**Sound**
• *Digestive system* • *Teeth* • *Food chains*	• *Grouping living things* • *Classification keys* • *Adaptation of livingthings*	• *Compare and groupmaterials* • *Solids, liquids andgases* • *Changing state* • *Water cycle*	• *Uses of electricity* • *Simple circuits andswitches* • *Conductors and insulators*	• *How sounds aremade* • *Sound vibrations* • *Pitch and Volume*
• Identify and namethe parts of the human digestive system • Know the functionsof the organs in thehuman digestive system • Identify and know the different types of human teeth • Know the functions of different humanteeth • Use and construct food chains to identify producers, predators and prey	• Use classification keys to group, identify and name living things • Know how changesto an environment could endanger living things	• Know the temperature atwhich materials change state • Know about and explore how somematerials can change state • Know the part played by evaporation and condensation in thewater cycle • Group materials based on their stateof matter (solid, liquid, gas)	• Identify and name appliances that require electricity to function • Construct a seriescircuit • Identify and namethe components ina series circuit (including cells, wires, bulbs, switches and buzzers) • Predict and test whether a lamp willlight within a circuit • Know the functionof a switch • Know the difference betweena conductor and an insulator; giving examples of each	• Know how sound ismade, associating some of them withvibrating • Know how sound travels from a sourceto our ears • Know the correlationbetween pitch and the object producing a sound • Know the correlationbetween the volumeof a sound and the strength of the vibrations that produced it • Know what happensto a sound as it travels away from itssource

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Science Long Term Curriculum 2021/2022

Science: Year 5				
Biology		**Chemistry**	**Physics**	
All living things and their habitats	**Animals, including humans**	**Properties and changesin materials**	**Forces**	**Earth and Space**
• *Life cycles – plantsand animals* • *Reproductive processes* • *Famous naturalists*	• *Changes as humans develop from birth toold age*	• *Compare properties ofeveryday materials* • *Soluble/ dissolving*	• *Gravity* • *Friction* • *Forces and motion of mechanical devices*	• *Movement of the Earth and the planets* • *Movement of theMoon* • *Night and day*
• know the life cycle of different living things e.g. mammal,amphibian, insect and bird • know the differences betweendifferent life cycles • know the process of reproduction in plants • know the process of reproduction in animals	• create a timeline toindicate stages of growth in humans	• compare and group materials based on their properties (e.g. hardness,solubility, transparency, conductivity, [electrical & thermal], and responseto magnets • know and explain how a material dissolves to form a solution • know and show how to recover a substance from a solution	• know what gravity is and its impact on ourlives • identify and know theeffect of air and water resistance • identify and know theeffect of friction • explain how levers, pulleys and gears allow a smaller forceto have a greater effect.	• know about and explain the movement of the Earth and other planets relative to the Sun • know about and explain the movement of the Moon relative to theEarth • know and demonstrate hownight and day are created • describe the Sun,Earth and Moon (using the term spherical)

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Science Long Term Curriculum 2021/2022

Science: Year 6					
Chemistry	**Biology**			**Physics**	
Properties and changes in materials	**Animals, includinghumans**	**All living things and their habitats**	**Evolution and Inheritance**	**Electricity**	**Light**
• *Soluble/ dissolving* • *Reversible and* • *irreversible substances*	• *The circulatory system* • *Water transportation* • *Impact of exercise on body*	• *Classification of living things and the reasons for it*	• *Identical and non-identical off-spring* • *Fossil evidence and evolution* • *Adaptation and evolution*	• *Electrical components* • *Simple circuits* • *Fuses and voltage*	• *How light travels* • *Reflection* • *Ray models of light*
• know and explain how amaterial dissolves to forma solution • know and show how torecover a substance from a solution • know and demonstrate how some materials canbe separated (e.g. through filtering, sieving and evaporating) • know and demonstrate that some changes are reversible and some arenot • know how some changes result in the formation of a new material and that this isusually irreversible	• Identify and name the main parts of the human circulatory system • Know the function of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and lifestyle on health • Know the ways in which nutrients and water are transported in animals, including humans	• Classify living things into broad groups according to observable characteristics and based on similarities and differences • Know how living things have been classified • Give reasons for classifying plants and animals in a specific way	• Know how the Earth and living things have changed overtime • Know how fossils can be used to find out about the past • Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) • Know how animals and plants are adapted to suit their environment • Link adaptation over time to evolution • Know about evolution and can explain what it is	• Compare and give reasons for why components work and do not work in acircuit • Draw circuit diagrams using correct symbols • Know how the number and voltageof cells in a circuit links to the brightness of a lampor the volume of a buzzer	• Know how light travels • Know and demonstrate how we see objects • Know why shadows have the same shape as the objectthat casts them • Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

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Science Long Term Curriculum 2021/2022

Progression in working scientifically skills

This document shows how the working scientifically statements from the science National Curriculum for England are linked and built on across the three phases. To highlight the links, the skills statements are grouped under the following broader skills definitions.

- Asking questions and recognising that they can be answered in different ways
- Making observations and taking measurements
- Engaging in practical enquiry to answer questions
- Recording and presenting evidence
- Answering questions and concluding
- Evaluating and raising further questions and predictions
- Communicating their findings.

The working scientifically statements from the science National Curriculum for England are presented in bold. The bullet points that follow each statement are additional guidance that clarifies the expectations.

Working scientifically statements that feature in more than one of the broader skills definitions are shown in italics.

Years 1 and 2	Years 3 and 4	Years 5 and 6
Asking questions and recognising that they can be answered in different ways		
Asking simple questions and recognising that they can be answered in different ways • While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. • The children answer questions developed with the teacher often through a scenario. • The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.	**Asking relevant questions and using different types of scientific enquiries to answer them** • •The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. • The children answer questions posed by the teacher. • Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.

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Science Long Term Curriculum 2021/2022

Years 1 and 2	Years 3 and 4	Years 5 and 6
Making observations and taking measurements		
Observing closely, using simple equipment • Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. • They begin to take measurements, initially by comparisons, then using non-standard units.	**Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** • The children make systematic and careful observations. • They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.	**Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** • The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate date (closer to the true value).

Years 1 and 2	Years 3 and 4	Years 5 and 6
Engaging in practical enquiry to answer questions		
Performing simple tests • The children use practical resources provided to gather evidence to answer questions generated by themselves or the things. They sort and group these things, identifying their own criteria for sorting. • They use simple secondary sources 9such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. **Identifying and classifying** • Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. • They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.	**Setting up simple practical enquiries, comparative and fair tests** • The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. • They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time and; pattern seeking. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

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Science Long Term Curriculum 2021/2022

Years 1 and 2	Years 3 and 4	Years 5 and 6
Recording and presenting evidence		
Gathering and recording date to help in answering questions • The children record their observations e.g. using photographs, videos, drawing, labelled diagrams or in writing. • They record their measurements .e.g. using prepared tables pictograms, tally charts and block graphs. • They classify using simple prepared tables and sorting rings.	**Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions** **Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables** • The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classification .e.g. using tables, Venn diagrams, Carroll diagrams. • Children are supported to present the same data in different ways in order to help with answering the question.	**Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** • The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • Children present the same data in different ways in order to help with answering the question.

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Science Long Term Curriculum 2021/2022

Years 1 and 2	Years 3 and 4	Years 5 and 6
Answering questions and concluding		
Using their observations and ideas to suggest answers to questions • Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.	**Using straightforward scientific evidence to answer questions or to support their findings** • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.	**Identifying scientific evidence that has been used to support or refute ideas or arguments** • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. • They talk about how their scientific ideas change due to new evidence that they have gathered. • They talk about how new discoveries change scientific understanding.
Using their observations and ideas to suggest answers to questions • The children recognise "biggest and smallest", "best and worst" etc. from their data.	**Identifying differences, similarities or changes related to simple scientific ideas and processes** • Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.	**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** • In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.

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Science Long Term Curriculum 2021/2022

Years 1 and 2	Years 3 and 4	Years 5 and 6
	Evaluating and raising further questions and predictions	
	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.	**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** • They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. • They identify any limitations that reduce the trust they have in their data.
	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car or an additional surface. • Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.	**Using test results to make predictions to set up further comparative and fair tests** • Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

Years 1 and 2	Years 3 and 4	Years 5 and 6
	Communicating their findings	
	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.	**Reporting and presenting findings from enquiries, including conclusion, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** • They communicate their findings to an audience using relevant scientific language and illustrations.

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Science Long Term Curriculum 2021/2022

Understanding of the World: EYFS
Working Scientifically
❑ Ask simple questions
❑ Set up an experiment to see the changing states of matter between a solid, liquid and gas
❑ Explain to someone what has been learned from an investigation they have beeninvolved with

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Plants	
Birth to three	• Explore natural materials, indoors and outside.
Nursery	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • 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.
Reception	• Draw information from a simple map. (Reception – Living things and their habitats) • Explore the natural world around them. (Reception – Living things and their habitats) • Describe what they see, hear and feel whist outside. (Reception – Living things and their habitats) • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) • Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)
Year 1	• 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.
Year 2	• Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and suitable temperature to grow and stay healthy. • Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 – Living things and their habitats)
Year 3	• 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.
Year 4	• Recognise that living things can be grouped in a variety of ways. (Y4 – Living things and their habitats) • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 – Living things and their habitats)
Year 5	• Describe the life process of reproduction in some plants and animals. (Y5 – Living things and their habitats)
Year 6	• Describe how loving things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats)
Key Stage 3	• Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Living things and their habitats	
Birth to three	• Explore natural materials, indoors and outside.
Nursery	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Begin to understand the need to respect and care for the natural environment and all living things.
Reception	• Draw information from a simple map. • Explore the natural world around them. • Describe what they see, hear and feel whist outside. • Recognise some environments that are different to the one in which they live.
Year 1	• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 – Plants) • Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 – Plants) • Identify and name a variety of common animals including fish, amphibians, reptiles, bird and mammals. (Y1 – Animals, including humans) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 – Animals, including humans) • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, bird and mammals, including pets. (Y1 – Animals, including humans) • Observe changes across the four seasons. (Y1 – Seasonal change)
Year 2	• 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 sited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including microhabitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. • Notice that animals, including humans, have offspring which grow into adults. (Y2 – Animals including humans)
Year 3	• Explore the part that flowers play in the life cycle of flowering plants including pollination, seed formation and seed dispersal. (Y3 – Plants)
Year 4	• 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. • Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 – Animals, including humans)
Year 5	• 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.
Year 6	• Describe how loving 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. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6 – Evolution and inheritance) • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 – Evolution and inheritance)
Key Stage 3	• Reproduction in humans (as an example of a mammal, including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. • Reproduction in plants, including flower structure, wind and insect pollination fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. • Differences between species.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Animals, including humans	
Birth to three	• Explore natural materials, indoors and outside. • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	• Use all their senses in hands-on exploration of natural materials. • Begin to make sense of their own life-story and family's history. • 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.
Reception	• Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Recognise some environments that are different to the one in which they live.
Year 1	• Identify and name a variety of common animals including fish, amphibians, reptiles, bird 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, bird 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.
Year 2	• 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. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. (Y2 – Living things and their habitats)
Year 3	• 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.
Year 4	• 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.
Year 5	• Describe the changes as humans develop to old age. • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 – Living things and their habitats) • Describe the life process of reproduction in some plants and animals. (Y5 – Living things and their habitats)
Year 6	• 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. • 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. (Y6 – Living things and their habitats). • Give reasons for classifying plants and animals based on specific characteristics. (Y6 – Living things and their habitats)
Key Stage 3	• Reproduction in humans (as an example of a mammal, including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. • The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. • The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. • The structure and functions of the gas exchange system in humans, including adaptations to function. • The mechanism of breathing to move air in and out of the lungs. • The impact of exercise, asthma and smoking on the human gas exchange system.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Evolution and inheritance	
Birth to three	• Make connections between the features of their family and other families. • Notice differences between peoples.
Nursery	• Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Living things and their habitats)
Reception	• Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)
Year 1	
Year 2	• Identify that most living things live in habitats to which they are sited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 – Living things and their habitats) • Notice that animals, including humans, have offspring which grow into adults. (Y2 – Animals including humans)
Year 3	• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 – Rocks) • Explore the part that flowers play in the life cycle of flowering plants including pollination, seed formation and seed dispersal. (Y3 – Plants)
Year 4	• Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 – Living things and their habitats)
Year 5	• Describe the life process of reproduction in some plants and animals. (Y5 – Living things and their habitats)
Year 6	• 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.
Key Stage 3	• Heredity as the process by which genetic information is transmitted from one generation to the next. • A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. • Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Seasonal changes	
Birth to three	
Nursery	• Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans)
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.
Year 1	• Observe changes across the four seasons. • Observe and describe the weather associated with the seasons and how day length varies.
Year 2	
Year 3	• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 – Light).
Year 4	
Year 5	• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 – Earth and space)
Year 6	
Key Stage 3	• The seasons and the Earth's tilt, day length at different times of the year, in different hemispheres.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Materials	
Birth to three	• Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes they notice.
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	• 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.
Year 2	• 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.
Year 3	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 – Rocks) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 – Rocks) • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 – Forces and magnets)
Year 4	• Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change 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. • Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 – Electricity)
Year 5	• 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 mixture 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.
Year 6	
Key Stage 3	• Chemical reactions as the rearrange of atoms. • Representing chemical reactions using formulae and using equations. • Combustion, thermal decomposition, oxidation and displacement reactions. • Defining acids and alkalis in terms of neutralisation reactions. • The pH scale for measuring acid/alkalinity; and indicators.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Rocks	
Birth to three	• Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	• Use all their senses in hands-on exploration of natural materials. (Nursery – Living things and their habitats) • Explore collections of materials with similar and/or different properties. (Nursery – Living things and their habitats)
Reception	• Explore the natural world around them. (Reception – Living things and their habitats) • Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats)
Year 1	• Distinguish between an object and the material from which it is made. (Y1 – Materials • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 – Materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 – Materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 – Materials)
Year 2	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 – Materials)
Year 3	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 – Rocks) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 – Rocks) • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 – Forces and magnets)
Year 4	
Year 5	
Year 6	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 – Evolution and inheritance)
Key Stage 3	• The composition of the Earth. • The structure of the Earth. • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Light	
Birth to three	• Repeat actions that have an effect.
Nursery	• Explore how things work. • Talk about the differences in materials and changes they notice.
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 – Animals, including humans) • Describe the simple physical properties of a variety of everyday materials. (Y1 – Materials)
Year 2	
Year 3	• 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.
Year 4	
Year 5	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 – Properties and changes of materials)
Year 6	• 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.
Key Stage 3	• The similarities and differences between light waves and waves in matter. • Light waves travelling through a vacuum; speed of light. • The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. • Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focussing (qualitative): the human eye. • Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. • Colours and the different frequencies of light, white light and prisms (qualitative only): different colour effects in absorption diffuse reflection.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

	Forces
Birth to three	• Repeat actions that have an effect.
Nursery	• Explore how things work. • Explore and talk about different forces they feel. • Talk about the differences between materials and changes they notice.
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	
Year 2	• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 – Materials)
Year 3	• 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.
Year 4	
Year 5	• 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.
Year 6	
Key Stage 3	• Magnetic fields by plotting with compass, representation by field lines. • Earth's magnetism, compass and navigation. • Forces as pushes or pulls, arising from the interaction between two objects. • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. • Moment as the turning effect of force. • Forces; associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. • Forces measured in Newtons, measurements of stretch or compression as force is changed.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

	Sound
Birth to three	• Repeat actions that have an effect.
Nursery	• Explore how things work.
Reception	• Describe what they see, hear and feel whilst outside.
Year 1	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 0 Animals, including humans)
Year 2	
Year 3	
Year 4	• 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.
Year 5	
Year 6	
Key Stage 3	• Waves on water as undulations which travel though water with transverse motion; these waves can be reflected, and add or cancel – superposition. • Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. • Sound needs a medium to travel, the speed of sound in air in water, in solids. • Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. • Auditory range of humans and animals. • Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. • Waves transferring information for conversion to electrical signals by microphone.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

	Electricity
Birth to three	• Repeat actions that have an effect.
Nursery	• Explore how things work.
Reception	
Year 1	
Year 2	
Year 3	
Year 4	• 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.
Year 5	
Year 6	• 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.
Key Stage 3	• Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. • Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. • Differences in resistance between conducting and insulting components (quantitative). • Static electricity.

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Science Long Term Curriculum 2021/2022

National Curriculum statements in red are from other linked topics.

Earth and space	
Birth to three	• Explore and respond to different natural phenomena in their setting and on trips.
Nursery	
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	• Observe changes across the four seasons. (Y1 – Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 – Seasonal changes)
Year 2	
Year 3	
Year 4	
Year 5	• 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.
Year 6	
Key Stage 3	• Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). • Our Sun as a star, other stars in our galaxy, other galaxies. • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. • The light year as a unit of astronomical distance.