

Science Knowledge Progression Document

Strands

At EYFS, the knowledge progression takes full account of the Early Learning Goals of:

- Changes in the Natural World

• At key stage 1, the knowledge progression takes full account of the national curriculum's strands of:

- Biology
- Chemistry
- Physics
- Working Scientifically

At key stage 2, the knowledge progression takes full account of the national curriculum's strands of:

- Biology
- Chemistry
- Physics
- Working Scientifically

EYFS and National Curriculum Subject Content

Strand

Changes in the Natural World

At the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand the effect of the changing seasons on the natural world around them.

EYFS

Explore the natural world around them.
 Describe what they see, hear and feel whilst outside, including plants and animals
 Begin to name a range of common animals
 Draw pictures of animals and plants around them
 Be able to sort animals, plants and humans.
 To develop an understanding of how animals grow and change over time
 To make observations of animals and plants and explains why some things occur
 To observe and know how to talk about patterns and changes
 To know how to show care and concern for living things and the environment
 To know the changes that happen in each season and the effect on the world around them
 Experience natural and human made materials.
 Use the vocabulary needed to name specific features of the natural world, both natural and manmade
 Begin to understand the need to respect and care for the natural environment
 To know some similarities and differences in the natural world around them and contrasting environments, drawing on their experiences and what has been read in class
 To know their senses and use them to explore objects
 To explore materials and name things that are the same and different.
 Name and describe everyday materials based on their simple properties
 Play with a range of materials and discover whether they can be changed
 Identify a range of materials and experiment with how they behave in different conditions.
 To know some forces and explore the impact they have on different objects
 To explore and name different forces they can feel

Oracy – 'Talk like a' Scientist

similarities
 differences
 hard
 runny
 soft
 It changed from/to
 I found out
 changes
 Pictures
 Series of pictures
 I can see
 season
 weather
 best
 worst
 prior learning
 question
 tests
 sets of tasks
 question
 compare
 guess

Science Curriculum Map

| | T1 | T2 | T3 | T4 | T5 | T6 |
|--------|----|---|--|---|--|--|
| Year 1 | | <p>Meteorology & Botany</p> <ul style="list-style-type: none"> • To know how to observe changes in weather across the four seasons. • To know how to observe and describe the weather associated with each season. • To know that the length of day changes throughout the year. • To know that other places around the world that have the same weather as the UK. • To know that it is important that we never look directly at the sun. • To explore the work of Anders Celsius and Daniel Fahrenheit. <p><i>To know what they have found out and how they found it.</i></p> <p><i>To know how to show they understand what happened in their investigation.</i></p> <p>Botany</p> <ul style="list-style-type: none"> • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a range of deciduous and evergreen trees <ul style="list-style-type: none"> • To know how to use simple equipment e.g. magnifying glasses, microscopes. • To know that there are ways to observe things closely – looking with magnifying glasses, microscopes. • To know how to suggest what might happen using some prior understanding. | <p>Nutrition</p> <ul style="list-style-type: none"> • To know the importance of eating the right amounts and types of food. • To know about the importance of being hygienic around food and cooking methods. <p>Anatomy</p> <ul style="list-style-type: none"> • Identify, name, draw and label the basic parts of the human body and identify parts used for senses. • To know the names of the main body parts (head, neck, arms, elbows, legs, knees, face, hair, teeth) • To explore the work of Louis Pasteur. <ul style="list-style-type: none"> • To know that there are many ways to record learning. • To know how to record data in a simple table | <p>Zoology</p> <ul style="list-style-type: none"> • To know a range of common animals, including fish, amphibians, reptiles, birds and mammals – use animals that children should have seen in zoos/museums. • To know the type of diet that animals have – herbivore, omnivore, carnivore. • To know and describe and compare the basic structure of a range of different animals (fish, amphibians, reptiles, mammals and birds). <ul style="list-style-type: none"> • To know that a prediction is saying what we think will happen using prior knowledge from the world. | <p>Engineering</p> <ul style="list-style-type: none"> • To know the difference between an object and a material from which it is made. • To know the names of a variety of everyday materials including wood, plastic, metal, glass, water and rock. • To know how to describe the simple physical properties of a range of everyday materials. • To know how to compare and group together a variety of everyday materials on the basis of their simple properties (hard/soft, absorbent/not absorbent, rough/smooth etc.). • To know how to identify and compare the suitability of materials. <ul style="list-style-type: none"> • To know that there are tests to find answers to questions. • To know how to carry out tests to answer questions. | <p>Botany</p> <ul style="list-style-type: none"> • Identify the basic structure of flowering plants and trees – stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. • Identify and name different sources of food for animals. • Understand the difference between evergreen and deciduous trees. • Identify a range of deciduous and evergreen trees. <p><i>• To know that a prediction is saying what we think will happen using prior knowledge from the world.</i></p> |

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| Year 2 | Botany <ul style="list-style-type: none"> • To know how seeds and bulbs grow into mature plants and how they need a suitable temperature, light and water. • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a variety of flowering plants and trees. • To know the difference between evergreen and deciduous trees. • To know a range of deciduous and evergreen trees. • To know how to use simple equipment e.g. magnifying glasses, microscopes. • To know that there are standard units of measure which can be used to take recordings – g, kg, m, cm. • To know that that data is recorded in a table. • To know how to record data in a table using tallies. • To know how to present data using a pictogram. • know how to interpret results to understand any surprises in the results. | | | Science - Zoology <ul style="list-style-type: none"> • To know that living creatures have offspring which grow into adults. • To know the difference between living, non-living and dead things. • To know the basic needs for survival of animals including humans. • To know that we can give evidence to make our prediction stronger. • To know how to suggest what might happen using prior understanding and a causal conjunction (because | Science - Engineering <ul style="list-style-type: none"> • To know the suitability of a range of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. • To know that some solid objects can have different properties • To know that questions can be tested to be answered. • To know how to ask questions which can be tested. • To know that there are different ways to perform a test using simple equipment. • To know how to use simple equipment to perform a test (jugs, beakers, timers). • To know that scientists reflect on what they have learnt. | Science -Zoology & Ecology <p>Classify and sort things into the categories of living, non-living and dead things.</p> <p>Ecology</p> <ul style="list-style-type: none"> • To know that living creatures need habitats which give them the basic things they need to survive (water, food, air) • To know that animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To know a variety of plants and animals in their habitats, including micro-habitats. • To know and name a variety of common wild and garden plants that can be found in the UK. • To know that that there are ways to observe things closely – looking with magnifying glasses, microscopes. • To know how to understand and explain/expand on what their results show. • To know how to share their new knowledge. |
| Year 3 | Geology <ul style="list-style-type: none"> • To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (e.g. metamorphic, igneous and sedimentary). • To know and be able to describe, in simple terms, how fossils are formed when things that have lived are trapped within rock. • To know that soils are made from rocks and organic matter. • To know how rocks, change over time. | Kinetics <ul style="list-style-type: none"> • To know how to compare how objects move on different surfaces depending on the properties from which they are made. • To know that some forces need contact between two objects, but magnetic forces can act at a distance. • To know how different magnets can have different strengths. • To know how to observe how magnets attract or repel each other and attract some materials and not others. | Anatomy <ul style="list-style-type: none"> • To know 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. • To know that humans and some other animals have skeletons and muscles for support, protection and movement. | | | Ecology <ul style="list-style-type: none"> • To know the functions of different parts of trees and plants, including the stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. • To know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and understand how they vary from plant to plant • To know the way in which water is transported within plants. • To know the importance of leaves for nutrition and flowers for reproduction. |

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| | <ul style="list-style-type: none"> •To explore the work of Mary Anning •To know that a prediction can be used to explain the effect something has. •To know how to predict cause and effect using a causal conjunction (because). | <ul style="list-style-type: none"> •To know how to 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. •To know magnets as having two poles. •To be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. •To know how magnets can be damaged if they are dropped. •To explore the work of Albert Einstein. <p>Optics</p> <ul style="list-style-type: none"> •To know that light is needed in order to see things and that dark is the absence of light. •To know that light is reflected from surfaces. •To know that light from the sun can be dangerous and that there are ways to protect their eyes. •To know that shadows are formed when the light from a light source is blocked by an opaque object. •To be able to find patterns in the way that the size of shadows changes. <ul style="list-style-type: none"> •To know that questions can be asked and answered by carrying out scientific enquiry. •To know that results are used to draw simple conclusions and raise further questions. •To know that scientific evidence is used to answer questions or to support findings. •To know how to measure tests using a range of equipment. •To know how to measure tests using a range of equipment with increasing accuracy (data loggers). •To know that observations can depend on conditions for scientific enquiry. | | | | <ul style="list-style-type: none"> •To know how to ask questions which can be answered by carrying out scientific enquiry. •To know that that standard units of measure can be used to take recordings – g, kg, m, cm, mm, l, ml. •To know how to measure using standard units of measure (g, kg, m, cm, mm, l, ml) •To know how to represent data in a bar graph. •To know how to use results to draw conclusions. •To know how to use my conclusion to ask further questions. |
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| | | <ul style="list-style-type: none"> • To know how to identify the conditions that change when carrying out scientific enquiry. | | | | |
| Year 4 | <p>Acoustics</p> <ul style="list-style-type: none"> • To know how sounds are made and understand that these create vibrations in the air. • To know that vibrations from sounds, travel through a medium to the ear. • To know how to find patterns between the pitch of a sound and features of the object that produced it. • To know that there is a pattern between the volume of a sound and the strength of the vibrations that produced it. • To know that sounds get fainter as the distance from the sound source increases. <ul style="list-style-type: none"> • To know how to predict a trend (relationship prediction) using a causal conjunction (because). • To know how to ask relevant scientific questions to be answered by carrying out scientific enquiry. • To know how to take accurate measurements in standard units. • To know that that results are recorded in different ways – measurements, tallies, drawings, labelled diagram, tables/charts, pictures. • To know how to record data appropriately using measurements, tallies, drawings, labelled diagrams, tables/charts and pictures. • To know how to measure tests using a range of equipment with increasing accuracy (thermometers and data loggers). | <p>Anatomy</p> <ul style="list-style-type: none"> • To Know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, small and large intestines). • To know the different types of teeth in humans and their simple functions. • To know and interpret a variety of food chains, identifying producers, predators and prey. • To know the difference between vertebrates and invertebrates and to sort a range of creatures using this property. <ul style="list-style-type: none"> • To know that that observations for scientific enquiries are limited by the accuracy of the measurements and use of equipment. • To know how to make systematic observations. | | <p>Electrology</p> <ul style="list-style-type: none"> • To know that common appliances that run on electricity • To know that a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • To know 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 • To know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • To know some common conductors and insulators, and associate metals with being good conductors. <ul style="list-style-type: none"> • To know that a prediction can be used to explain the trend (relationship) between two things. • To know that that in a fair test one variable is changed and one variable is measured while all other conditions are kept the same. • To know how to choose and alter appropriate variables whilst all other conditions are kept the same. • To know how to interpret data using | <p>Geology</p> <ul style="list-style-type: none"> • To know how to compare and group materials together, according to whether they are solids, liquids or gases. • To know 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). • To know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. <ul style="list-style-type: none"> • To know that that relevant scientific questions need to be asked and answered through different types of scientific enquiries. | <p>Ecology</p> <ul style="list-style-type: none"> • To know that living things can be grouped in a variety of ways. • To know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment. • To know that environments can change and that this can sometimes pose dangers to living things. <ul style="list-style-type: none"> • To know that conclusions can be drawn from patterns, similarities and differences. • To know how to use the change in patterns, similarities and differences I have seen to help draw conclusions. • To know how to report on findings from enquiries through oral and written explanations, displays or presentations. |

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| | | | | measurements, tallies, drawings, labelled diagrams, tables/charts and pictures. | | |
| Year 5 | <p>Taxonomy</p> <ul style="list-style-type: none"> • To know and be able to describe the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. • To know the life process of reproduction in some plants and animals • To know that scientific knowledge can be used to explain a prediction. | <p>Astrophysics</p> <ul style="list-style-type: none"> • To know the movement of the Earth, and other planets, relative to the Sun in the solar system. • To know and be able to describe the movement of the Moon relative to the Earth. • To know that the Sun, Earth and Moon are approximately spherical bodies. • To know how to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. • To know that that keeping observations as consistent as possible can improve enquiry. • To know how to take accurate measurements with increasing accuracy and precision. • To know how to think of their own questions about scientific phenomena, analyse functions, relationships and interactions more systematically. | <p>Geology</p> <ul style="list-style-type: none"> • To know how to compare and group materials together, according to whether they are solids, liquids or gases. • To know 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). • To know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • To know the effects of acidity on a range of rocks • To know that how to accurately use further test measuring devices, including digital and analogue scales, measuring cylinders and beakers. • To know how to use digital and analogue scales, measuring cylinders and beakers. • To know how to report and present findings from enquiries – including conclusions, causal relationships and explanations and degree of trust in results. | | <p>Astrophysics</p> <ul style="list-style-type: none"> • To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To know the effects of air resistance, water resistance and friction, that act between moving surfaces. • To know how to explore up thrust and investigate how to sink a bottle. • To know how to explore the weight of air by investigating inflated and deflated balloons. • To know how to investigate water resistance by creating different sized boats for hulls. • To know how to investigate how the size of a boat's hull affects the speed of its movement. • To know how to use prior knowledge to make a relationship prediction and explain it using scientific knowledge. • To know that scientific knowledge can be used to explain a prediction. • To know how to use test results to make predictions for further tests • To know that how and when to repeat tests and measurements. • To know how to justify the necessity to change elements • To know how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • To know how to choose specific/appropriate methods of recording. • To know how to identify relationships within results • To know that how to plan for different types of scientific enquiries to answer questions - including recognizing and controlling variables when necessary. | |
| Year 6 | <p>Human Biology & Taxonomy</p> <p>Human Biology</p> <ul style="list-style-type: none"> • To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • To know how animals and plants are adapted to suit their environment in different ways and | | <p>Human Biology</p> <ul style="list-style-type: none"> • To know the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • To know the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • To know the ways in which nutrients and water are transported within animals, including humans. | | | <p>Electrology & Optics</p> <p>Electrology</p> <ul style="list-style-type: none"> • To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • To 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 • To use recognised symbols when representing a simple circuit in a diagram |

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| | <p>that adaptation may lead to evolution.</p> <ul style="list-style-type: none"> • To know the work of Grace Hopper, Charles Darwin, Sir Tim Berners-Lee, Rosalind Franklin, Wilhelm Röntgen and Esther Lederberg. <p>Taxonomy</p> <ul style="list-style-type: none"> • To describe the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. • To describe the life process of reproduction in some plants and animals • To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • To know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. • To explore the work of Grace Hopper, Charles Darwin, Sir Tim Berners-Lee, Rosalind Franklin, Wilhelm Röntgen and Esther Lederberg. <ul style="list-style-type: none"> • To know how and when to repeat observations for scientific enquiries to vary conditions and make improvements. • To know how to take accurate measurements and take repeated readings when necessary. • To know that which testing equipment to choose to carry out a scientific enquiry. • To know that how to identify conditions that were imperfectly controlled and explain how these might affect results. • To know how to choose appropriate equipment. • To know how to control variables. | | <ul style="list-style-type: none"> • To know that predictions can be justified using scientific knowledge. • To know how to use prior knowledge to make a hypothesis about a relationship between two things and justify it using scientific knowledge. | | | <p>Optics</p> <ul style="list-style-type: none"> • To know that light appears to travel in straight lines. • To know how to 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. • To know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To know how to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. • To explore the work of Sir Isaac Newton, Alhazen, Kepler and James Clerk Maxwell <ul style="list-style-type: none"> • To know that predictions can be justified using scientific knowledge. • To know how to use prior knowledge to make a hypothesis about a relationship between two things and justify it using scientific knowledge. • To know how to use test results to make predictions for further comparative and fair tests. • To know how to draw conclusions based on data and observations and use evidence to justify ideas using scientific knowledge and language. • To know that how to recognise and remove outliers from a set of data. • To know that what discrete and continuous data is. • To know how to justify the removal of outliers from a set of data. • To know how to select appropriate data to justify conclusions. • To know how to identify anomalies within results and use these to inform my conclusions • To know how and when to repeat different types of scientific enquiries to answer questions. • To know how to repeat different types of scientific enquiries. |
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Substantive Knowledge

| Strand | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| Biology | | | | | | |
| Living things and their habitats | | Ecology <ul style="list-style-type: none"> • To know that living creatures need habitats which give them the basic things they need to survive (water, food, air) • To know that animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To know how to identify a variety of plants and animals in their habitats, including micro-habitats. • To know the name of a variety of common wild and garden plants that can be found in the UK | | Ecology <ul style="list-style-type: none"> • To know that living things can be grouped in a variety of ways. • To know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment • To know that environments can change and that this can sometimes pose dangers to living things. | Taxonomy <ul style="list-style-type: none"> • To know the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. • To know the life process of reproduction in some plants and animals | Taxonomy <ul style="list-style-type: none"> • To know the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. • To know the life process of reproduction in some plants and animals |
| Animals including humans | Zoology <ul style="list-style-type: none"> • To know a range of common animals, including fish, amphibians, reptiles, birds and mammals – use animals that children should have seen in zoos/museums. • To know the type of diet that animals have – herbivore, omnivore, carnivore. • Describe and compare the basic structure of a range of different animals (fish, amphibians, reptiles, mammals and birds). | Zoology <ul style="list-style-type: none"> • To know how to classify and sort things into the categories of living, non-living and dead things. • To know how living creatures need habitats which give them the basic things they need to survive (water, food, air) • To know how animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To know a variety of plants and animals in their habitats, including micro-habitats. | Anatomy <ul style="list-style-type: none"> • To know 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 • To know that humans and some other animals have skeletons and muscles for support, protection and movement. | Anatomy <ul style="list-style-type: none"> • To know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, small and large intestines). • To know the different types of teeth in humans and their simple functions • To know how to construct and interpret a variety of food chains, identifying producers, predators and prey. • To know the difference between vertebrates and invertebrates and to sort a range of creatures using this property. | | Human Biology <ul style="list-style-type: none"> • To know the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • To know the impact of diet, exercise, drugs and lifestyle on the way their bodies function • To know the ways in which nutrients and water are transported within animals, including humans. |

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| | | <ul style="list-style-type: none"> To be able to name a variety of common wild and garden plants that can be found in the UK. | | | | |
| Plants | Botany <ul style="list-style-type: none"> To know the basic structure of flowering plants and trees – stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. To know different sources of food for animals. To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. To know a range of deciduous and evergreen trees | Botany <ul style="list-style-type: none"> To know how seeds and bulbs grow into mature plants and how they need a suitable temperature, light and water. To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. To know a variety of flowering plants and trees. To know the difference between evergreen and deciduous trees. To know a range of deciduous and evergreen trees. | Ecology <ul style="list-style-type: none"> To know, and be able to describe, the functions of different parts of trees and plants, including the stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. To know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and understand how they vary from plant to plant To know the way in which water is transported within plants. To know the importance of leaves for nutrition and flowers for reproduction. | | | |
| Nutrition, Evolution and inheritance | Nutrition <ul style="list-style-type: none"> To know the importance of eating the right amounts and types of food. To know the importance of being hygienic around food and cooking methods. To be able to name, draw and label the basic parts of the human body and identify parts used for senses. To know the names of the main body parts (head, neck, arms, elbows, legs, knees, face, hair, teeth) To know the work of Louis Pasteur. | | | | | Human Biology <ul style="list-style-type: none"> To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents To know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. To know the work of Grace Hopper, Charles Darwin, Sir Tim Berners-Lee, Rosalind Franklin, Wilhelm Röntgen and Esther Lederberg. |
| Chemistry | | | | | | |
| Everyday Materials and uses of | Engineering <ul style="list-style-type: none"> To know the difference between an object and a | Engineering <ul style="list-style-type: none"> To know the suitability of a range of everyday materials | | | | |

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| everyday materials | <p>material from which it is made.</p> <ul style="list-style-type: none"> • To know a variety of everyday material including wood, plastic, metal, glass, water and rock. • To know the simple physical properties of a range of everyday materials. • To know how to compare and group together a variety of everyday materials on the basis of their simple properties (hard/soft, absorbent/not absorbent, rough/smooth etc.). • To know how to identify and compare the suitability | including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. Understand that some solid objects can have different properties | | | | |
| Rocks and States, and changes, of Matter | | | <p>Rocks</p> <ul style="list-style-type: none"> • To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (e.g. metamorphic, igneous and sedimentary). • To know how to describe in simple terms how fossils are formed when things that have lived are trapped within rock • To know that soils are made from rocks and organic matter. • To understand how rocks, change over time. • To explore the work of Mary Anning | <p>Geology</p> <ul style="list-style-type: none"> • To know how to compare and group materials together, according to whether they are solids, liquids or gases. • To know how to 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). • To know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • To know the effects of acidity on a range of rocks | <p>Geology</p> <ul style="list-style-type: none"> • To know how to compare and group materials together, according to whether they are solids, liquids or gases. • To know 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). • To know and be able to describe in detail the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • To know effects of acidity on a range of rocks | |
| Physics | | | | | | |
| Seasonal Changes Earth and Space | <p>Meteorology</p> <ul style="list-style-type: none"> • To know how to observe changes in weather across the four seasons. • To know, and be able to describe, the weather associated with each season. | | | | <p>Astrophysics</p> <ul style="list-style-type: none"> • To know the movement of the Earth, and other planets, relative to the Sun in the solar system. • To know, and be able to describe, the movement of the Moon relative to the Earth. | |

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| | <ul style="list-style-type: none"> • To know the length of day changes throughout the year. • To know how to identify other places around the world that have the same weather as the UK. • To know why it is important that we never look directly at the sun. • To explore the work of Anders Celsius and Daniel Fahrenheit. | | | | <ul style="list-style-type: none"> • To know how to describe the Sun, Earth and Moon as approximately spherical bodies. • To know how to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. | |
| Forces and Magnets | | | Kinetics <ul style="list-style-type: none"> • To know how to compare how objects move on different surfaces depending on the properties from which they are made. • To know that some forces need contact between two objects, but magnetic forces can act at a distance. • To know how different magnets can have different strengths. • To know how magnets, attract or repel each other and attract some materials and not others. • To know how to 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. • To know that magnets have two poles. • To be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. • To know that magnets can be damaged if they are dropped. • To know the work of Albert Einstein. | | Astrophysics <ul style="list-style-type: none"> • To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To know the effects of air resistance, water resistance and friction, that act between moving surfaces. • To know how to explore up thrust and investigate how to sink a bottle. • To know how to explore the weight of air by investigating inflated and deflated balloons. • To know how to investigate water resistance by creating different sized boats for hulls. • To know how to investigate how the size of a boat's hull affects the speed of its movement. • To know how to design parachutes and explore how shape can limit/extend the amount of drag. • To know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | Forces and Magnets |
| Light | | | Optics <ul style="list-style-type: none"> • To know that light is needed in order to see things and that dark is the absence of light. | | | Optics <ul style="list-style-type: none"> • To know that light appears to travel in straight lines. • To know how to use the idea that light travels in straight lines |

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| | | | <ul style="list-style-type: none"> • To know that light is reflected from surfaces. • To know that light from the sun can be dangerous and that there are ways to protect their eyes. To recognise that shadows are formed when the light from a light source is blocked by an opaque object. • To know how to find patterns in the way that the size of shadows changes. | | | <p>to explain that objects are seen because they give out or reflect light into the eye.</p> <ul style="list-style-type: none"> • To know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To know how to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. • To know the work: Sir Isaac Newton, Alhazen, Kepler and James Clerk Maxwell |
| Electricity | | | | Electrology <ul style="list-style-type: none"> • To know common appliances that run on electricity • To know how to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • To know 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 • To know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • To know some common conductors and insulators, and associate metals with being good conductors. | | Electrology <ul style="list-style-type: none"> • To know how to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • To know how to 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 • To know how to use recognised symbols when representing a simple circuit in a diagram |
| Sound | | | | Acoustics <ul style="list-style-type: none"> • To know how sounds are made and understand that these create vibrations in the air. • To know that vibrations from sounds, travel through a medium to the ear. • To know how to find patterns between the pitch of a sound and features of the object that produced it. | | |

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| | | | | <ul style="list-style-type: none"> To know how to find patterns between the volume of a sound and the strength of the vibrations that produced it To know that sounds, get fainter as the distance from the sound source increases. | | |
| Disciplinary Knowledge | | | | | | |
| Working Scientifically (Concluding) | <p>To know what they have found out and how they found it.</p> <p>To know how to show they understand what happened in their investigation.</p> | <p>To know how to interpret results to understand any surprises in the results.</p> <p>To know that scientists reflect on what they have learnt.</p> <p>To know how to understand and explain/expand on what their results show.</p> <p>To know how to share their new knowledge.</p> | <p>To know that results are used to draw simple conclusions and raise further questions.</p> <p>To know that scientific evidence is used to answer questions or to support findings.</p> <p>To know how to use results to draw conclusions.</p> <p>To know how to use my conclusion to ask further questions.</p> | <p>To know that conclusions can be drawn from patterns, similarities and differences.</p> <p>To know how to use the change in patterns, similarities and differences I have seen to help draw conclusions.</p> <p>To know how to report on findings from enquiries through oral and written explanations, displays or presentations.</p> | <p>To know how to report and present findings from enquiries – including conclusions, causal relationships and explanations and degree of trust in results.</p> <p>To know how to identify relationships within results.</p> | <p>To know how to draw conclusions based on data and observations and use evidence to justify ideas using scientific knowledge and language.</p> <p>To know how to select appropriate data to justify conclusions.</p> <p>To know how to identify anomalies within results and use these to inform my conclusions</p> |
| Oracy | Answers | New knowledge, results | Conclusion, scientific evidence, findings | Changes, similarities, differences | Relationships | Anomalies, justify |
| Working Scientifically (Interpreting and Recording Data) | <p>To know that there are many ways to record learning.</p> <p>To know how to record data in a simple table.</p> | <p>To know that that there are standard units of measure which can be used to take recordings – g, kg, m, cm.</p> <p>To know that that data is recorded in a table.</p> <p>To know how to record data in a table using tallies.</p> <p>To know how to present data using a pictogram.</p> | <p>To know that that standard units of measure can be used to take recordings – g, kg, m, cm, mm, l, ml.</p> <p>To know how to measure using standard units of measure (g, kg, m, cm, mm, l, ml)</p> <p>To know how to represent data in a bar graph.</p> | <p>To know that that results are recorded in different ways – measurements, tallies, drawings, labelled diagram, tables/charts, pictures.</p> <p>To know how to record data appropriately using measurements, tallies, drawings, labelled diagrams, tables/charts and pictures.</p> <p>To know how to interpret data using measurements, tallies, drawings, labelled diagrams, tables/charts and pictures.</p> | <p>To know how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>To know how to choose specific/appropriate methods of recording.</p> | <p>To know that how to recognise and remove outliers from a set of data.</p> <p>To know that what discrete and continuous data is.</p> <p>To know how to justify the removal of outliers from a set of data.</p> |
| Oracy | Record, table | Data, measure, tables, tallies | Standard units of measure | Present, interpret | Method | Outliers |
| Working Scientifically (Observing) | <p>To know how to use simple equipment e.g. magnifying glasses, microscopes.</p> <p>To know that that there are ways to observe things closely – looking with magnifying glasses, microscopes.</p> | <p>To know how to use simple equipment e.g. magnifying glasses, microscopes.</p> <p>To know that that there are ways to observe things closely – looking with magnifying glasses, microscopes.</p> | <p>To know that observations can depend on conditions for scientific enquiry.</p> <p>To know how to identify the conditions that change when carrying out scientific enquiry.</p> | <p>To know that that observations for scientific enquiries are limited by the accuracy of the measurements and use of equipment.</p> <p>To know how to make systematic observations.</p> <p>To know how to take accurate measurements in standard units.</p> | <p>To know that that keeping observations as consistent as possible can improve enquiry.</p> <p>To know how to take accurate measurements with increasing accuracy and precision.</p> | <p>To know how and when to repeat observations for scientific enquiries to vary conditions and make improvements.</p> <p>To know how to take accurate measurements and take repeated readings when necessary.</p> |

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| Oracy | Observe, look closely, equipment | Over time, equipment, ruler, metre stick | Depend | Enquiry, systematic, accurate | Consistent, precision | Repeat, conditions |
| Working Scientifically (Predicting) | <p>To know that a prediction is saying what we think will happen using prior knowledge from the world.</p> <p>To know how to suggest what might happen using some prior understanding.</p> | <p>To know that we can give evidence to make our prediction stronger.</p> <p>To know how to suggest what might happen using prior understanding and a causal conjunction (because).</p> | <p>To know that a prediction can be used to explain the effect something has.</p> <p>To know how to predict cause and effect using a causal conjunction (because).</p> | <p>To know how to predict a trend (relationship prediction) using a causal conjunction (because).</p> <p>To know that a prediction can be used to explain the trend (relationship) between two things.</p> | <p>To know how to use prior knowledge to make a relationship prediction and explain it using scientific knowledge.</p> <p>To know that scientific knowledge can be used to explain a prediction.</p> <p>To know how to use test results to make predictions for further tests</p> | <p>To know that predictions can be justified using scientific knowledge.</p> <p>To know how to use prior knowledge to make a hypothesis about a relationship between two things and justify it using scientific knowledge.</p> <p>To know how to use test results to make predictions for further comparative and fair tests.</p> |
| Oracy | Prediction, suggest | Evidence | Explain, cause, effect | Trend | Scientific knowledge | Hypothesis, justify |
| Working Scientifically (Questioning) | <p>To know that scientists ask questions about the world.</p> <p>To know how to ask questions about the world around us.</p> | <p>To know that questions can be tested to be answered.</p> <p>To know how to ask questions which can be tested.</p> | <p>To know that questions can be asked and answered by carrying out scientific enquiry.</p> <p>To know how to ask questions which can be answered by carrying out scientific enquiry.</p> | <p>To know how to ask relevant scientific questions to be answered by carrying out scientific enquiry.</p> <p>To know that that relevant scientific questions need to be asked and answered through different types of scientific enquiries.</p> | <p>To know that how to plan for different types of scientific enquiries to answer questions - including recognizing and controlling variables when necessary.</p> <p>To know how to think of their own questions about scientific phenomena, analyse functions, relationships and interactions more systematically.</p> | <p>To know how and when to repeat different types of scientific enquiries.</p> <p>To know how to repeat different types of scientific enquiries.</p> |
| Oracy | World around, why, how, why | Answered, tested | Scientific enquiry | Relevant | Variables, control | Repeat, attribute, check, organise |
| Working Scientifically (Testing) | <p>To know that that there are tests to find answers to questions.</p> <p>To know how to carry out tests to answer questions.</p> | <p>To know that there are different ways to perform a test using simple equipment.</p> <p>To know how to use simple equipment to perform a test (jugs, beakers, timers).</p> | <p>To know that that how to measure tests using a range of equipment.</p> <p>To know how to measure tests using a range of equipment with increasing accuracy (data loggers).</p> | <p>To know that that in a fair test one variable is changed and one variable is measured while all other conditions are kept the same.</p> <p>To know how to choose and alter appropriate variables whilst all other conditions are kept the same.</p> <p>To know how to measure tests using a range of equipment with increasing accuracy (thermometers and data loggers).</p> | <p>To know that how to accurately use further test measuring devices, including digital and analogue scales, measuring cylinders and beakers.</p> <p>To know that how and when to repeat tests and measurements.</p> <p>To know how to use digital and analogue scales, measuring cylinders and beakers.</p> <p>To know how to justify the necessity to change elements</p> | <p>To know that which testing equipment to choose to carry out a scientific enquiry.</p> <p>To know that how to identify conditions that were imperfectly controlled and explain how these might affect results.</p> <p>To know how to choose appropriate equipment.</p> <p>To know how to control variables.</p> |
| Oracy | Find answers to questions | Equipment, perform a test | Measure, range of equipment, suitable | Variable, conditions, alter | Accurate, repeat tests | Controlled, control test |

Oracy – ‘Talk like a ...’ Scientist Progression

| Strand | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| Biology | | | | | | |
| All living things and their habitats | | Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc. | | Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate | Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings | Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering |
| Animals, including humans | Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves • Names of animals experienced first-hand from each vertebrate group • Parts of the body • Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue | Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta) | Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine | Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain | | Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle |
| Plants | Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area (see list above) Names of garden and wild flowering plants in the local area | Light, shade, sun, warm, cool, water, grow, healthy | Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal) | | | |
| Nutrition and Evolution and Inheritance | | | | | | Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils |
| Chemistry | | | | | | |
| Everyday Materials and uses of everyday materials | Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through | Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching | | | | |
| Rocks and | | | Rock, stone, pebble, boulder, grain, crystals, layers, hard, | Solid, liquid, gas, state change, melting, freezing, | Thermal/electrical insulator/conductor, change | |

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| States, and changes, of Matter | | | soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil | melting point, boiling point, evaporation, temperature, water cycle | of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material | |
| Physics | | | | | | |
| Seasonal Changes Earth and Space | Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length | | | | Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets | |
| Forces and Magnets | | | Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole | | Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears | |
| Light | | | Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous | | | straight lines, light rays |
| Electricity | | | | Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol | | Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage |
| Sound | | | | Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation | | |