



## Science

### Sticklepath Intent



Our curricular aims are to develop **Growing Minds** that are **Curious, Critical Communicators**.

Science at Sticklepath will open up a world of exploration and discovery providing opportunities to wonder and ponder the big 'How and Why' questions. We want Sticklepath children to be **deeply curious** about their natural and man-made world, starting with the familiar to make sense of the wider world they live in. From the spark of curiosity they will learn to question, seeking out and applying knowledge to rationally explain understanding.

We want Sticklepath children to be **deep critical thinkers** and develop evidence-based knowledge and understanding, with an appreciation of the value that science has brought to their lives and to wider humanity. They will develop the key skills of scientific enquiry through questioning, observation, interpretation and explanation. Sticklepath children will learn to use a variety of approaches to answer a range of scientific questions. By hooking back to previous learning and building up their knowledge, they will develop a deep understanding of key concepts of science, allowing them to predict how things will behave.

Sticklepath children will learn the disciplines of biology, physics and chemistry, understanding the terms and their applications. As they develop these disciplines, Sticklepath children will become rigorous scientists, critically engaging with evidence and checking and validating data.

We want Sticklepath children to see the complexities of science. For example, for our youngest children to realise that influences such as the change in seasons affect the environments they observe or in KS2 recognising that science adjusts its views over time based on new research and discoveries.

At Sticklepath, we actively teach children to use precise, scientific and mathematical vocabulary, empowering them to **communicate** their thinking through hypothesising, explaining, drawing conclusions and critically evaluating.

Our **deeply curious, critical children** will use a range of appropriate mediums to **communicate** their scientific learning and enthusiasm for the subject to a range of audiences. They will be able to collect, analyse, interpret and **communicate** with a range of data gathered through investigations.

## **Science: The Big Conceptual Picture**

A distinct feature of the science curriculum is 'working scientifically'. This is an approach to investigation and experimentation within science that develops specific skills to support questioning, predicting, planning, observing, recording, interpreting and evaluating. This approach connects the science curriculum and is revisited throughout each key stage to support the application and understanding of scientific knowledge.

Our disadvantaged children can face particular challenges due to their circumstances and therefore it is particularly important that they have opportunities to learn scientific vocabulary and be empowered through practical investigation in order to discover and formulate their own thinking. Much of this vocabulary has been put on the drive in the Curriculum> Science folder.

Our desire is that all our children become curious about the world around them and to understand the positive impact science can have on our lives.

One of the big ideas within science is the way in which science has a methodology or approach that is very distinctive. This will be revisited as a concept in experiments and investigation within different contexts across the science curriculum.

## **ENQUIRY SKILLS - Working Scientifically**

Children working as scientists and using the approaches they use is an essential understanding of the science curriculum. Where other subjects may have knowledge as the strand that links progression across the school, science will have working scientifically skills. Children will revisit an enquiry approach in different contexts to enable them to progress their scientific skills. The visuals below are used to support children's understanding of the process behind 'working scientifically'. The EY statements are included to give prominence to the importance of developing and sustaining curiosity at an early age.

**Asking questions**

Asking questions that can be answered using a scientific enquiry.

**Making predictions**

Using prior knowledge to suggest what will happen in an enquiry.

**Setting up tests**

Deciding on the method and equipment to use to carry out an enquiry.

**Observing and measuring**

Using senses and measuring equipment to make observations about the enquiry.

**Recording data**

Using tables, drawings and other means to note observations and measurements.

**Interpreting and communicating results**

Using information from the data to say what you found out.

**Evaluating**

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.



	Working scientifically	Field of study 1	Field of study 2	Field of study 3	Field of study 4	Field of study 5
FS		<p><b>Key Enquiry Skill: Asking Questions</b></p> <p>Intellectual progression focus: <b>Observe and describe and simple vocab</b></p> <p>(Field of study) (KNOWLEDGE) (VOCAB)</p>	<p><b>Key Enquiry Skill: Asking Questions</b></p> <p>Intellectual progression focus: <b>Observe and describe and simple vocab</b></p> <p>(Field of study) (KNOWLEDGE) (VOCAB)</p>	<p><b>Key Enquiry Skill: Asking Questions</b></p> <p>Intellectual progression focus: <b>Observe and describe and simple vocab</b></p> <p>(Field of study) (KNOWLEDGE) (VOCAB)</p>	<p><b>Key Enquiry Skill: Asking Questions</b></p> <p>Intellectual progression focus: <b>Observe and describe and simple vocab</b></p> <p>(Field of study) (KNOWLEDGE) (VOCAB)</p>	<p><b>Key Enquiry Skill: Making Predictions</b></p> <p>Intellectual progression focus: <b>Observe and describe and simple vocab</b></p> <p>(Field of study) (KNOWLEDGE) (VOCAB)</p>

<p>Year 1</p>	<p>Asking simple questions and recognising that they can be answered in different ways</p> <p>Observing closely, using simple equipment performing simple tests</p> <p>Identifying and classifying</p> <p>Using their observations and ideas to suggest answers to questions</p> <p>Gathering and recording data to help in answering questions</p>	<p><b>Key Enquiry Skill: Making predictions</b> Intellectual progression focus: Views and Opinions</p> <p><b>Plants</b></p> <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p><b>(VOCAB)</b></p>	<p><b>Key Enquiry Skill: Observing and measuring</b> Intellectual progression focus: Observe</p> <p><b>Materials</b></p> <p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Views and Opinions</p> <p><b>Seasons</b></p> <p>Observe changes across the 4 seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies</p>	<p><b>Key Enquiry Skill: Observing and measuring</b> <b>Communicating results.</b> Intellectual progression focus: Appropriate Vocabulary</p> <p><b>Animals including Humans</b></p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p>	
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Year 2	<p>Asking simple questions and recognising that they can be answered in different ways</p> <p>Observing closely, using simple equipment performing simple tests</p> <p>Identifying and classifying</p> <p>Using their observations and ideas to suggest answers to questions</p> <p>Gathering and recording data to help in answering questions</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Appropriate Vocabulary</p> <p><b><u>Living things and their Habitats</u></b></p> <p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats</p>	<p><b>Key Enquiry Skill: Setting up tests</b> Intellectual progression focus: Select</p> <p><b><u>Electricity</u></b></p> <p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Appropriate Vocabulary</p> <p><b><u>Animals including Humans</u></b></p> <p>Notice that animals, including humans, have offspring which grow into adults</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p><b>Key Enquiry Skill: Setting up tests</b> Intellectual progression focus: Select</p> <p><b><u>States of Matter</u></b></p> <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> <p>The above knowledge is currently in year 4 -</p>	

		<p>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</p>	<p>Recognise some common conductors and insulators, and associate metals with being good conductors</p> <p>The above knowledge is currently in year 4 - suggested year 2 coverage in black.</p>		<p>suggested year 2 coverage in black.</p>	
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<p>Year 3</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them</p> <p>Setting up simple practical enquiries, comparative and fair tests</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p>	<p><b>Key Enquiry Skill: Interpreting and communicating results</b> Intellectual progression focus: Views and opinions</p> <p><b>Plants</b> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p><b>Key Enquiry Skill: Recording data and evaluating</b> Intellectual progression focus: Conclusions</p> <p><b>Forces and magnets</b> Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others</p> <p>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Describe magnets as having 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p>	<p><b>Key Enquiry Skill: Observing and Measuring</b> Intellectual progression focus: Compare and contrast</p> <p><b>Rocks</b></p> <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p>	<p><b>Key Enquiry Skill: Recording data</b> Intellectual progression focus: Understanding through explanation</p> <p><b>Light</b></p> <p>Recognise that they need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>Find patterns in the way that the size of shadows change</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Precise vocab</p> <p><b>Animals including humans</b></p> <p>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.</p> <p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>
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<p>Year 4</p>	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p><b>Key Enquiry Skill: Evaluating</b> Intellectual progression focus: <b>Conclusions</b></p> <p><b>States of Matter</b></p> <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: <b>Compare and contrast</b></p> <p><b>Living things and habitats</b></p> <p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p><b>Key Enquiry Skill: Evaluating</b> Intellectual progression focus: <b>Conclusions</b></p> <p><b>Sound</b></p> <p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p><b>Key Enquiry Skill: Making predictions</b> Intellectual progression focus: <b>Reasoning</b></p> <p><b>Electricity</b></p> <p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors</p>	<p><b>Key Enquiry Skill: Asking question</b> Intellectual progression focus: <b>Accurate and Precise Vocabulary</b></p> <p><b>Earth and space</b></p> <p>Describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>Describe the movement of the moon relative to the Earth</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>
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<p>Year 5</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>	<p><b>Key Enquiry Skill: Setting up tests, recording data and interpreting results.</b> Intellectual progression focus: Understand through explanation.</p> <p><b>Properties of Materials</b></p> <p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair</p>	<p><b>Key Enquiry Skill: Asking questions.</b> Intellectual progression focus: Accurate and precise vocabulary</p> <p><b>Animals including humans</b></p> <p>Describe the changes as humans develop to old age.</p> <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>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.</p>	<p><b>Key Enquiry Skill: Setting up tests, recording data and evaluating.</b> Intellectual progression focus: Understand through explanation and evaluate.</p> <p><b>Forces</b></p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>	<p><b>Key Enquiry Skill: Observing and measure:</b> Intellectual progression focus: Accurate and precise vocabulary</p> <p><b>Rocks</b></p> <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Compare and Contrast</p> <p><b>Living things and habitats</b></p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p>
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		<p>tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>				
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<p>Year 6</p>	<p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p><b>Key Enquiry Skill: Asking questions</b> Intellectual progression focus: Comparing and contrasting</p> <p><b>Living things and Habitats</b></p> <p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>	<p><b>Key Enquiry Skill: Making predictions, observing and measuring, Evaluating</b> Intellectual progression focus: Hypothesis, remodel.</p> <p><b>Physics: Electricity</b></p> <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>	<p><b>Key Enquiry Skill: Asking Questions</b> Intellectual progression focus: Reasoning</p> <p><b>Biology: Evolution</b></p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	<p><b>Key Enquiry Skill: Observing and measuring</b> Intellectual progression focus: Understanding through explanation</p> <p><b>Physics: Light</b></p> <p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	<p><b>Key Enquiry Skill: Making predictions, observing and measuring, evaluating</b> Intellectual progression focus: Hypothesis, remodel.</p> <p><b>Chemistry: States</b></p> <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>
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