

<p><b>Year 4</b> <b>Autumn 1</b> <b>Topic: Invasion</b> <b>Science: Biology</b> <b>Food and the Digestive System</b></p>	
<p><b>Previous learning</b></p> <p>In Year 3, children learnt that humans have a skeleton and muscles for movement, support and protecting organs. The children learnt that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food.</p> <p>This project teaches children about the human digestive system. They explore the main parts, starting with the mouth and teeth, identifying teeth types and their functions. They link this learning to animals' diets and construct food chains to show the flow of energy.</p>	
<p><b>Substantive Knowledge in Science</b></p> <p>An ecosystem is a community of living organisms and their environments that interact with each other.</p> <p>The digestive system is responsible for digesting food and absorbing nutrients and water.</p> <p>The main parts of the digestive system are the mouth, oesophagus, stomach, small intestines, large intestines and rectum.</p> <p>There are four different types of teeth: incisors, canines, premolars and molars.</p>	<p><b>Disciplinary knowledge in Science</b></p> <p>Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Use straightforward scientific evidence to answer questions or to support their findings.</p>
Lesson 1	<p><b>Ecosystems</b></p> <ul style="list-style-type: none"> <li>To understand the features of ecosystems.</li> </ul>
Lesson 2	<p><b>Food chains</b></p> <ul style="list-style-type: none"> <li>To construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>
Lesson 3	<p><b>Changes in habitats</b></p> <ul style="list-style-type: none"> <li>To understand living things within an ecosystem being interdependent.</li> </ul>

Lesson 4	<b>Purpose and parts</b>
	<ul style="list-style-type: none"> <li>To describe the simple functions of the basic parts of the digestive system in humans.</li> </ul>
Lesson 5	<b>Teeth types</b>
	<ul style="list-style-type: none"> <li>To identify the different types of teeth in humans and their simple functions.</li> </ul>
Lesson 6	<b>Toothpaste investigation</b>
	<ul style="list-style-type: none"> <li>To investigate the effectiveness of different toothpaste.</li> </ul>
<b>Vocabulary</b>	
<p>mouth, oesophagus, saliva, stomach, small intestines, large intestines, rectum, excretion, molars, canines, incisors</p> <p>food chain, energy, producer, predator, prey, decomposer</p>	

<b>Year 4</b> <b>Autumn 2</b> <b>Topic: Invasion</b> <b>Science: Physics</b> <b>Sound</b>	
<b>Previous learning</b>	
<p>In EYFS and KS1, children learnt that ears are used for hearing. Different body parts are used for different things.</p> <p>This project teaches children about sound, how sound is made and how sound travels as vibrations through a medium to the ear. They learn about pitch and volume and find out how both can be changed.</p>	
<b>Substantive Knowledge in Science</b>	<b>Disciplinary knowledge in Science</b>
<p>When vibrations stop, the sound stops.</p> <p>The volume of sound is measured in decibels (dB).</p> <p>The more energy put into a sound source, the larger the vibrations and the larger the sound waves.</p> <p>Pitch is how high or low a sound is.</p>	<p>Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Use straightforward scientific evidence to answer questions or to support their findings.</p>

Lesson 1	<b>Exploring sound</b>
	<ul style="list-style-type: none"> <li>To identify how sounds are made, associating some of them with something vibrating.</li> </ul>
Lesson 2	<b>How does sound travel?</b>
	<ul style="list-style-type: none"> <li>To recognise that vibrations from sounds travel through a medium to the ear.</li> </ul>
Lesson 3	<b>Muffling sounds – Breadth and depth</b>
	<ul style="list-style-type: none"> <li>To measure sound in a unit of measurement called decibels (dB).</li> </ul>
Lesson 4	<b>Volume and distance investigation</b>
	<ul style="list-style-type: none"> <li>To recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>
Lesson 5	<b>Changing the volume and pitch of sounds</b>
	<ul style="list-style-type: none"> <li>To find patterns between the volume and pitch of a sound and features of the object that produced it.</li> </ul>
Lesson 6	<b>Sound Investigation</b>
	<ul style="list-style-type: none"> <li>To ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.</li> </ul>
<b>Vocabulary</b>	
high pitch, low pitch, vibration, volume	

<b>Year 4</b> <b>Spring 1</b> <b>Topic: Misty Mountain, Winding River</b> <b>Science: Biology</b> <b>Grouping and Classifying</b>	
<b>Previous learning</b>	
<p>In EYFS, the children learnt that plants and animals can be identified according to their features. In Year 2, the children were aware that animals can be divided into six distinct groups: mammals, fish, birds, reptiles, invertebrates and amphibians. In Year 3, the children learnt that animals have further features that help scientists define the animal groups.</p> <p>This project teaches children about grouping living things, known as classification. They study the animal and plant kingdoms and use and create classification keys to identify living things.</p>	
<b>Substantive Knowledge in Science</b>	<b>Disciplinary knowledge in Science</b>
Scientists classify living things according to shared characteristics.	Ask relevant questions and using different types of scientific enquiries to answer them. Set up simple practical enquiries, comparative and fair tests.
There are five main groups of vertebrates:	Make systematic and careful observations and, where appropriate, take accurate

<p>mammals, fish, reptiles, birds and amphibians.</p> <p>There are six main groups of invertebrates: annelids, molluscs, arachnids, crustaceans, insects and myriapods.</p> <p>The plant kingdom is divided into vascular and non-vascular plants.</p>	<p>measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Use straightforward scientific evidence to answer questions or to support their findings.</p>
<p>Lesson 1</p>	<p><b>Guess who?</b></p> <ul style="list-style-type: none"> <li>To recognise that living things can be grouped in a variety of ways.</li> </ul>
<p>Lesson 2</p>	<p><b>Understanding classification keys</b></p> <ul style="list-style-type: none"> <li>To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> </ul>
<p>Lesson 3</p>	<p><b>Animal kingdom</b></p> <ul style="list-style-type: none"> <li>To recall and describe each step of fossil formation.</li> </ul>
<p>Lesson 4</p>	<p><b>Sorting vertebrates and invertebrates</b></p> <ul style="list-style-type: none"> <li>To sort, compare and contrast vertebrates and invertebrates.</li> </ul>
<p>Lesson 5</p>	<p><b>Plant kingdom</b></p> <ul style="list-style-type: none"> <li>To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> </ul>
<p>Lesson 6</p>	<p><b>Our changing environment</b></p> <ul style="list-style-type: none"> <li>To recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul>
<p style="text-align: center;"><b>Vocabulary</b></p>	
<p style="text-align: center;">classification, natural influences, human influences, habitat destruction, risk</p>	

**Year 4**  
**Spring 2**  
**Topic: Misty Mountain, Winding River**  
**Science: Chemistry**  
**States of Matter**

**Previous learning**

In Year 3, the children learnt about materials such as rocks and minerals. They explored the process of dissolving in relation to fossils and sediments.

This project teaches children about solids, liquids and gases and their characteristic properties. They observe how materials change state as they are heated and cooled, and learn key terminology associated with these processes.

**Substantive Knowledge in Science**

Water changes state from solid (ice)  $\rightleftharpoons$  liquid (water) at 0°C and from liquid (water)  $\rightleftharpoons$  gas (water vapour) at 100°C.

The process of changing from a solid to liquid is called melting.

The reverse process of changing from a liquid to a solid is called freezing.

The process of changing from a liquid to a gas is called evaporation.

The reverse process of changing from a gas to a liquid is called condensation.

**Disciplinary knowledge in Science**

Ask relevant questions and using different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Lesson 1

**Classifying solids, liquids and gases**

- To compare and group materials together, according to whether they are solids, liquids or gases.

Lesson 2

**Particle theory**

- To explain why solids, liquids and gases have different properties.

Lesson 3

**Melting, freezing, evaporation and condensation**

- To observe and explain how some materials change state when they are heated or cooled, (including links to the water cycle).

Lesson 4

**Focus on water**

- To take accurate measurements in standard units, using a range of equipment.

Lesson 5

**Observing, measuring and recording changes over time**

- To understand that different materials have different melting and boiling points.

Lesson 6	<b>Melting investigation</b>
	<ul style="list-style-type: none"> <li>To investigate the factors that affect the rate that ice melts.</li> </ul>
<b>Vocabulary</b>	
boiling point, condensation, condense, cool, freeze, heat, melt, reversible, water vapour	

<b>Year 4</b> <b>Summer 1</b> <b>Topic: Ancient Civilisations</b> <b>Science: Physics</b> <b>Electrical Circuits and Conductors</b>
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<b>Previous learning</b>
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In Year 3, the children learnt that materials have different properties. Some materials have magnetic properties and magnetic materials are attracted to magnets.

This project teaches children about further properties of materials. They learn about electrical appliances and safety. They construct simple series circuits and name their parts and functions, including switches, wires and cells. They investigate electrical conductors and insulators and identify common features of conductors. It also teaches children about programmable devices. They combine their learning to design and make a nightlight.

<b>Substantive Knowledge in Science</b>	<b>Disciplinary knowledge in Science</b>
<p>A series circuit has a single path for an electric current to flow through.</p> <p>A series circuit must be a complete loop to work and have a source of power from a battery or cell.</p> <p>Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control.</p>	<p>Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Use straightforward scientific evidence to answer questions or to support their findings.</p>

Lesson 1	<b>Exploring electricity</b>
	<ul style="list-style-type: none"> <li>To identify common appliances that run on electricity.</li> </ul>

Lesson 2	<b>Components</b>
	<ul style="list-style-type: none"> <li>To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> </ul>

Lesson 3	<b>Making series circuits</b>
	<ul style="list-style-type: none"> <li>To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> </ul>
Lesson 4	<b>Fixing circuits</b>
	<ul style="list-style-type: none"> <li>To 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.</li> </ul>
Lesson 5	<b>Programmable technologies</b>
	<ul style="list-style-type: none"> <li>To identify programmable technologies and their locations.</li> </ul>
Lesson 6	<b>Programming traffic lights</b>
	<ul style="list-style-type: none"> <li>To apply their understanding of computing to program, monitor and control their products.</li> </ul>
<b>Vocabulary</b>	
electricity, power, battery, buzzer, cell, circuit, complete circuit, component, crocodile clip, electric current, lamp, LED, light-emitting diode, motor, series circuit, switch, wire	

<b>Year 4</b> <b>Summer 2</b> <b>Topic: Ancient Civilisations</b> <b>Science: Physics</b> <b>Electrical Circuits and Conductors</b>	
<b>Previous learning</b>	
<p>In Year 3, the children learnt that materials have different properties. Some materials have magnetic properties and magnetic materials are attracted to magnets.</p> <p>This project teaches children about further properties of materials. They learn about electrical appliances and safety. They construct simple series circuits and name their parts and functions, including switches, wires and cells. They investigate electrical conductors and insulators and identify common features of conductors. It also teaches children about programmable devices. They combine their learning to design and make a nightlight.</p>	
<b>Substantive Knowledge in Science</b>	<b>Disciplinary knowledge in Science</b>
<p>Design features of nightlights include a switch, light source and an attractive casing.</p> <p>Components can be added to circuits to achieve a particular goal.</p> <p>These include bulbs for lighthouses and torches, buzzers for burglar alarms.</p> <p>Electrical conductors allow electricity to flow through them, whereas insulators do not.</p>	<p>Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest</p>

improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Lesson 1	<b>Conductors and insulators</b> <ul style="list-style-type: none"><li>To recognise some common conductors and insulators, and associate metals with being good conductors.</li></ul>
Lesson 2	<b>Recapping electrical knowledge</b> <ul style="list-style-type: none"><li>To apply our knowledge of electricity, programming and design and technology.</li></ul>
Lesson 3	<b>Research and develop ideas</b> <ul style="list-style-type: none"><li>To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</li></ul>
Lesson 4	<b>Communicating my design</b> <ul style="list-style-type: none"><li>To generate, develop, model and annotate and communicate their ideas.</li></ul>
Lesson 5	<b>Constructing simple circuits</b> <ul style="list-style-type: none"><li>To construct operational simple series circuits using a range of components and switches for control.</li></ul>
Lesson 6	<b>Evaluate and improve</b> <ul style="list-style-type: none"><li>To evaluate ideas and products against a design criteria and consider the views of others to improve their work.</li></ul>
<b>Vocabulary</b>	
electricity, power, battery, buzzer, cell, circuit, complete circuit, component, crocodile clip, electric current, lamp, LED, light-emitting diode, motor, series circuit, switch, wire	