

Science Curriculum – 2 Year Cycle - Years 5/6



Intent

Learning is a change to long term memory. Our aim is to ensure that our students experience a wide breadth of study based on the national curriculum and have, by the end of each key stage, long-term memory of curriculum knowledge.

We aim to inspire in pupils a curiosity and fascination of the world through Biology, Chemistry and Physics. Teaching will equip children with scientific knowledge, methods, processes and uses of science so that they can explain what is occurring, predict how things will behave, and analyse causes.

Through the continued development of oracy skills, we will expand pupil's scientific vocabulary which will deepen as they progress through school. Through our science curriculum, we intend to inspire pupils to develop a fascination of science and an enquiring mind to answer their own questions.

Implementation

Science is taught through the 'Threshold Concept' of Working Scientifically. The threshold concept is delivered through the knowledge categories of Biology, Chemistry and Physics. Deliberate practise of these, whereby knowledge will be revisited, will enable a gradual deepening of their understanding.

Teachers will utilise investigations, purposeful experiences through visits and visitors, and a range of teaching styles in order to develop their understanding of science so that it is in their long-term memory.

Teachers will provide knowledge for children to use to plan investigations, make predictions, carry out observations, collect data and develop hypotheses, in order to deepen children's understanding.

Impact

Because learning is a change to long term memory it is impossible to see impact in the short term. However, we do use probabilistic assessment based on deliberate practise. This means that we look at the practices taking place to determine whether they are appropriate, related to our end of key stage goals. We use comparative judgements against Milestone statements, in the tasks we set (POP tasks) and in tracking students' work over time. We use lesson observations to see if the pedagogical style matches our depth expectations.

Impact is also measured through key questioning skills built into lessons, progress tests and child-led assessment against the objective (WAGBA), and summative assessments aimed at targeting next steps in learning.

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Year Group	Cycle	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
5/6	A	Earth and Space (Y5) Describe the movement of the Earth and other planets relative to the sun in the solar system. Describe the movement of the moon relative to the earth. Describe the sun, Earth and moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Sound (Y5) Find patterns between the volume of a sound and the strength of the vibrations that produced it. Find patterns between the pitch of a sound and the features of the object that produced it. Recognise that sounds get fainter as the distance from the sound source increases	Properties and Changes in Materials (Y5) Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some	British Science Week (2wks) Project Week (2 wks)	Living Things and their Habitats (Y5) Describe the difference in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Forces & Magnetism (Y5) Describe that magnets have 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which way poles are facing. Explain that unsupported objects call towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. Recognise that some mechanisms including lever, pulleys and gears allow a smaller force to have a greater effect.

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				<p>changes results 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> <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 tests, for the particular uses of everyday materials, including metals, wood and plastic</p>			
<p>Essential – there must be at least one experiment per term and this needs to be evidenced in books.</p>							

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B	<p>Animals including Humans (Y5/6) 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.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>	<p>Living Things and their Habitats (Y6) 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>Light (Y6) 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.</p>	<p>British Science Week (2wks)</p> <p>Project Week (2 wks)</p> <p>cast them, and to predict the size of shadows when the position of the light source changes.</p>	<p>Evolution and Inheritance (Y6) 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>Electricity (Y6) Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells in a circuit.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</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>Essential – there must be at least one experiment per term and this needs to be evidenced in books.</p>					

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Years 5/6 Teaching Sequence for Science (Milestone 3) CYCLE A <i>Threshold Concepts</i>			
Weeks	Autumn Term	Spring Term	Summer Term
Topic Title:	Earth and Space (Y5) <i>Understand the Earth's movement in space</i> Sound (Y5) <i>Investigate sound and hearing</i> <i>Work scientifically</i>	Properties and Changes in Materials (Y5) <i>Investigate materials</i> <i>Work scientifically</i> British Science Week <i>Work scientifically</i>	Living Things and their Habitats (Y5) <i>Investigate living things</i> <i>Work scientifically</i> Forces and Magnetism (Y5) <i>Understand movement, forces and magnets</i> <i>Work scientifically</i>
1	What do we know? – Cold Task Earth & Space: Describe the movement of the Earth and other planets relative to the sun in the solar system.	What do we know? – Cold Task Properties: 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.	What do we know? – Cold Task Living Things: Describe the difference in the life cycles of a mammal, an amphibian, an insect and a bird.
2	Retrieval – Solar system Earth & Space: Describe the movement of the moon relative to the earth. Describe the sun, Earth and moon as approximately spherical bodies.	Retrieval – last lesson Properties: 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.	Retrieval – last lesson Living Things: Describe the difference in the life cycles of a mammal, an amphibian, an insect and a bird.
3	Retrieval – Movement of the moon/Earth Earth & Space: Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Retrieval – Comparison Properties: Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes results 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. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering sieving and evaporating. Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials,	Retrieval – life cycles Living Things: Describe the life process of reproduction in some plants and animals.

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		including metals, wood and plastic	<i>It's time to shine!</i>
4	<p>Retrieval – last lesson</p> <p>Earth & Space: Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	<p>Retrieval – Irreversible/Reversible</p> <p>Properties: Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes results 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. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering sieving and evaporating. Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p>	<p>Retrieval – life cycles</p> <p>Living Things: Describe the life process of reproduction in some plants and animals.</p>
5	POP Task – Earth & Space	Experiment – Reversible/ Irreversible Changes	POP Task – Living Things
6	<p>What do we know? – Cold Task</p> <p>Sound: Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p>	Experiment – Reversible/ Irreversible Changes	<p>What do we know? – Cold Task</p> <p>Forces/Magnetism: Describe that magnets have 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which way poles are facing.</p>
7	<p>Retrieval – last lesson</p> <p>Sound: Find patterns between the pitch of a sound and the features of the object that produced it.</p>	POP Task – Properties and Changes of Materials	Experiment – Magnetism
8	<p>Retrieval – last lesson</p> <p>Sound: Find patterns between the pitch of a sound and the features of the object that produced it.</p>	British Science Week Work	<p>Retrieval – Magnetism</p> <p>Forces: Explain that unsupported objects call towards the Earth because of the force of gravity acting between the Earth and the falling object.</p>

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9	<p>Retrieval – Pitch Sound: Recognise that sounds get fainter as the distance from the sound source increases.</p>	<p>British Science Week Work</p>	<p>Retrieval – Gravity <i>It's time to shine!</i> Forces: Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p>
10	<p>Experiment - Sound</p>	<p>Class chosen Science project <i>Include an experiment</i></p>	<p>Retrieval – Air Resistance Forces: Recognise that some mechanisms including lever, pulleys and gears allow a smaller force to have a greater effect.</p>
11	<p>Experiment - Sound</p>	<p>Class chosen Science project <i>Include an experiment</i></p>	<p>Experiment – Forces</p>
12	<p>POP Task – Sound</p>	<p>Any catch up / Consolidation / You can begin the summer units</p>	<p>POP Task – Forces</p>

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Years 5/6 Teaching Sequence for Science (Milestone 3) CYCLE B <i>Threshold Concepts</i>			
Weeks	Autumn Term	Spring Term	Summer Term
Topic Title:	Animals including Humans (Y5/6) <i>Understand animals and humans</i> <i>Work scientifically</i> Living Things and Their Habitats (Y5/6) <i>Investigate living things</i>	Light (Y6) <i>Understand light and seeing</i> <i>Work scientifically</i> British Science Week <i>Work scientifically</i>	Evolution and Inheritance (Y6) <i>Understand evolution and inheritance</i> <i>Work scientifically</i> Electricity (Y6) <i>Understand electrical circuits</i> <i>Work scientifically</i>
1	What do we know? – Cold Task Animals: Describe the changes as humans develop to old age	What do we know? – Cold Task Light: Recognise that light appears to travel in straight lines.	What do we know? – Cold Task Evolution: Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
2	Retrieval – last lesson Animals: Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.	Retrieval – last lesson Light: 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.	Retrieval lesson – last lesson Evolution: Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
3	Retrieval – circulatory system Animals: Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.	Retrieval – straight lines Light: 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.	Retrieval lesson – fossils Evolution: Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
4	Retrieval – circulatory system Animals: 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.	Retrieval – straight lines Light: 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.	Retrieval lesson – offspring Evolution: Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

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5	<p>Retrieval – Diet/exercise</p> <p>Animals: 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>Retrieval – Light sources</p> <p>Light: 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>Retrieval lesson – Adaptation <i>to shine!</i></p> <p>Evolution: Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>
6	<p>Experiment - Exercise</p>	<p>Retrieval – Light sources</p> <p>Light: Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that.</p>	<p>POP Task – Evolution & Inheritance</p>
7	<p>POP Task – Animals including Humans</p>	<p>Experiment – Light/Shadows</p>	<p>What do we know? – Cold Task</p> <p>Electricity: Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells in a circuit.</p>
8	<p>What do we know? – Cold Task</p> <p>Living things: 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>POP Task – Light</p>	<p>Retrieval – voltage</p> <p>Electricity: Use recognised symbols when representing a simple circuit in a diagram.</p>
9	<p>Retrieval – last lesson</p> <p>Living things: 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>British Science Week Work</p>	<p>Retrieval – voltage</p> <p>Electricity: Use recognised symbols when representing a simple circuit in a diagram.</p>
10	<p>Retrieval – Classification</p> <p>Living things: Give reasons for classifying plants and animals based on specific characteristics</p>	<p>British Science Week Work</p>	<p>Retrieval – symbols</p> <p>Electricity: 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>
11	<p>POP Task – Living Things and their</p>	<p>Class chosen Science project</p>	<p>Experiment – Electricity</p>

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	Habitats	<i>Include an experiment</i>	<i>It's time to shine!</i>
12	Any catch up / Consolidation	Class chosen Science project <i>Include an experiment</i>	POP Task – Electricity