

Science Framework - Milestone 3

Intent	
<ul style="list-style-type: none"> • The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings. • Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations. • Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings. • High levels of originality, imagination or innovation in the application of skills. • The ability to undertake practical work in a variety of contexts, including fieldwork. • A passion for science and its application in past, present and future technologies. 	
Threshold Concepts	Skills
<p>Work scientifically This concept involves learning the methodologies of the discipline of science.</p>	<ul style="list-style-type: none"> • Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

<p>Biology Understand plants This concept involves becoming familiar with different types of plants, their structure and reproduction.</p>		<ul style="list-style-type: none"> • Relate knowledge of plants to studies of evolution and inheritance. • Relate knowledge of plants to studies of all living things.
<p>Understand animals and humans This concept involves becoming familiar with different types of animals, humans and the life processes they share.</p>		<ul style="list-style-type: none"> • Describe the changes as humans develop to old age. • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. • Describe the ways in which nutrients and water are transported within animals, including humans.
<p>Investigate living things This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.</p>		<ul style="list-style-type: none"> • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • Describe the life process of reproduction in some plants and animals. • Describe how living things are classified into broad groups according to common observable characteristics. • Give reasons for classifying plants and animals based on specific characteristics.
<p>Understand evolution and inheritance This concept involves understanding that organisms come into existence, adapt,</p>		<ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment

<p>change and evolve and become extinct.</p>		<p>in different ways and that adaptation may lead to evolution.</p>
<p>Chemistry - Investigate materials This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.</p>		<ul style="list-style-type: none"> • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how 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. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda.
<p>Physics Understand movement, forces and magnets This concept involves understanding what causes motion.</p>		<p>Magnets</p> <ul style="list-style-type: none"> • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. <p>Forces</p> <ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.

		<ul style="list-style-type: none"> • Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect.
<p>Understand light and seeing</p> <p>This concept involves understanding how light and reflection affect sight.</p>		<ul style="list-style-type: none"> • Understand that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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>Investigate sound and hearing</p> <p>This concept involves understanding how sound is produced, how it travels and how it is heard.</p>		<ul style="list-style-type: none"> • Find patterns between the pitch of a sound and features of the object that produced it. • Find patterns between the volume of a sound and the strength of the vibrations that produced it. • Recognise that sounds get fainter as the distance from the sound source increases.
<p>Understand electrical circuits</p> <p>This concept involves understanding circuits and their role in electrical applications.</p>		<ul style="list-style-type: none"> • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.
<p>Understand the Earth's movement in space</p>		<ul style="list-style-type: none"> • 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.

<p>This concept involves understanding what causes seasonal changes, day and night.</p>		<ul style="list-style-type: none">• 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.
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