

## Sciences

### Experiences and outcomes

The sciences framework provides a range of different contexts for learning which draw on important aspects of everyday life and work.

Learning in the sciences will enable me to:

- develop curiosity and understanding of the environment and my place in the living, material and physical world
- demonstrate a secure knowledge and understanding of the big ideas and concepts of the sciences
- develop skills for learning, life and work
- develop the skills of scientific inquiry and investigation using practical techniques
- develop skills in the accurate use of scientific language, formulae and equations
- apply safety measures and take necessary actions to control risk and hazards
- recognise the impact the sciences make on my life, the lives of others, the environment and on society
- recognise the role of creativity and inventiveness in the development of the sciences
- develop an understanding of the Earth's resources and the need for responsible use of them
- express opinions and make decisions on social, moral, ethical, economic and environmental issues based upon sound understanding
- develop as a scientifically-literate citizen with a lifelong interest in the sciences
- establish the foundation for more advanced learning and future careers in the sciences and the technologies.

## Planet Earth

	Early	First	Second	Third	Fourth
<p><b>Biodiversity and interdependence</b></p> <p>Learners explore the rich and changing diversity of living things and develop their understanding of how organisms are interrelated at local and global levels. By exploring interactions and energy flow between plants and animals (including humans) learners develop their understanding of how species depend on one another and on the environment for survival. Learners investigate the factors affecting plant growth and develop their understanding of the positive and negative impact of the human population on the environment.</p>	<p>I have observed living things in the environment over time and am becoming aware of how they depend on each other.</p> <p><b>SCN 0-01a</b></p>	<p>I can distinguish between living and non living things. I can sort living things into groups and explain my decisions.</p> <p><b>SCN 1-01a</b></p>	<p>I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction.</p> <p><b>SCN 2-01a</b></p>	<p>I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.</p> <p><b>SCN 3-01a</b></p>	<p>I understand how animal and plant species depend on each other and how living things are adapted for survival. I can predict the impact of population growth and natural hazards on biodiversity.</p> <p><b>SCN 4-01a</b></p>
		<p>I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food.</p> <p><b>SCN 1-02a</b></p>	<p>I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.</p> <p><b>SCN 2-02a</b></p> <p>Through carrying out practical activities and investigations, I can show how plants have benefited society.</p> <p><b>SCN 2-02b</b></p>	<p>I have collaborated on investigations into the process of photosynthesis and I can demonstrate my understanding of why plants are vital to sustaining life on Earth.</p> <p><b>SCN 3-02a</b></p>	<p>I have propagated and grown plants using a variety of different methods. I can compare these methods and develop my understanding of their commercial use.</p> <p><b>SCN 4-02a</b></p> <p>I can contribute to the design of an investigation to show the effects of different factors on the rate of aerobic respiration and explain my findings.</p> <p><b>SCN 4-02b</b></p>

## Planet Earth (continued)

	Early	First	Second	Third	Fourth
<b>Biodiversity and interdependence</b> (continued)	<p>I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them.</p> <p>SCN 0-03a</p>	<p>I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school.</p> <p>SCN 1-03a</p>	<p>I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use.</p> <p>SCN 2-03a</p>	<p>Through investigations and based on experimental evidence, I can explain the use of different types of chemicals in agriculture and their alternatives and can evaluate their potential impact on the world's food production.</p> <p>SCN 3-03a</p>	<p>Through investigating the nitrogen cycle and evaluating results from practical experiments, I can suggest a design for a fertiliser, taking account of its environmental impact.</p> <p>SCN 4-03a</p>





## Planet Earth (continued)

	Early	First	Second	Third	Fourth
<p><b>Energy sources and sustainability</b></p> <p>Learners explore types, sources and uses of energy and develop their understanding of how energy is transferred and conserved. They consider the relevance of these concepts to everyday life. They explore the nature and sustainability of energy sources and discuss benefits and assess possible risks to form an informed view of responsible energy use.</p>	<p>I have experienced, used and described a wide range of toys and common appliances. I can say 'what makes it go' and say what they do when they work.</p> <p><b>SCN 0-04a</b></p>	<p>I am aware of different types of energy around me and can show their importance to everyday life and my survival.</p> <p><b>SCN 1-04a</b></p>	<p>By considering examples where energy is conserved, I can identify the energy source, how it is transferred and ways of reducing wasted energy.</p> <p><b>SCN 2-04a</b></p> <p>Through exploring non-renewable energy sources, I can describe how they are used in Scotland today and express an informed view on the implications for their future use.</p> <p><b>SCN 2-04b</b></p>	<p>I can use my knowledge of the different ways in which heat is transferred between hot and cold objects and the thermal conductivity of materials to improve energy efficiency in buildings or other systems.</p> <p><b>SCN 3-04a</b></p> <p>By investigating renewable energy sources and taking part in practical activities to harness them, I can discuss their benefits and potential problems.</p> <p><b>SCN 3-04b</b></p>	<p>By contributing to an investigation on different ways of meeting society's energy needs, I can express an informed view on the risks and benefits of different energy sources, including those produced from plants.</p> <p><b>SCN 4-04a</b></p> <p>Through investigation, I can explain the formation and use of fossil fuels and contribute to discussions on the responsible use and conservation of finite resources.</p> <p><b>SCN 4-04b</b></p>
				<p>I can investigate the use and development of renewable and sustainable energy to gain an awareness of their growing importance in Scotland or beyond.</p> <p><b>TCH 2-02b</b></p>	

## Planet Earth (continued)

	Early	First	Second	Third	Fourth
<p><b>Processes of the planet</b></p> <p>Learners explore the changing states of matter and the physical and chemical processes which influence Earth's atmosphere and oceans. They learn about climate change as a natural process in time as well as the result of human activity. Through connections with collaborative studies of landscape, weather and climate in social studies they build up an integrated picture of the dynamic nature of Earth.</p>	<p>By investigating how water can change from one form to another, I can relate my findings to everyday experiences.</p> <p style="text-align: right;"><b>SCN 0-05a / SCN 1-05a</b></p>		<p>I can apply my knowledge of how water changes state to help me understand the processes involved in the water cycle in nature over time.</p> <p style="text-align: right;"><b>SCN 2-05a</b></p>	<p>By contributing to experiments and investigations, I can develop my understanding of models of matter and can apply this to changes of state and the energy involved as they occur in nature.</p> <p style="text-align: right;"><b>SCN 3-05a</b></p> <p>I can explain some of the processes which contribute to climate change and discuss the possible impact of atmospheric change on the survival of living things.</p> <p style="text-align: right;"><b>SCN 3-05b</b></p>	<p>I have developed my understanding of the kinetic model of a gas. I can describe the qualitative relationships between pressure, volume and temperature of gases.</p> <p style="text-align: right;"><b>SCN 4-05a</b></p> <p>Through exploring the carbon cycle, I can describe the processes involved in maintaining the balance of gases in the air, considering causes and implications of changes in the balance.</p> <p style="text-align: right;"><b>SCN 4-05b</b></p>