

Amport CE (Aided) Primary School



COURAGE COMPASSION RESPECT

Science Progression

(From HIAS Science Team)

## BIOLOGY

### Variation and Evolution

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Substantive Knowledge from Learning Journeys

*National Curriculum Statutory Requirement*

	<p><b><u>Habitats</u></b></p> <p><b>Knowledge Block 1- Adapted to survive</b></p> <ul style="list-style-type: none"> <li>• There is variation in all living things</li> <li>• Animals and plants live in a variety of different places called habitats</li> <li>• Animals and plants have adapted to survive in different habitats</li> <li>• Wild plants such as ferns, daisies, nettles and dandelions grow randomly.</li> <li>• Garden plants such as roses, tulips, poppies, daffodils are planted intentionally.</li> </ul> <p><b>Knowledge Block 2- Plants adaptations for survival</b></p> <ul style="list-style-type: none"> <li>• Plants have specific adaptations for survival</li> <li>• To survive they need to get water, light, and avoid being eaten</li> </ul> <p><b><u>Year 1- Seasons</u></b></p> <p><b>Knowledge Block 1- Surviving the changing seasons</b></p> <ul style="list-style-type: none"> <li>• There are four seasons, <b>Spring, summer, autumn</b> and <b>winter</b></li> <li>• Each season is about three months long</li> <li>• In Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer.</li> <li>• In autumn, the leaves fall off the trees and the amount of time we have in the day becomes less.</li> <li>• Winter has the shortest amount of time during the day and the weather is at its coldest.</li> <li>• In summer the trees are full of green leaves and the weather is at its warmest.</li> </ul> <p>(THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE PHYSICS- EARTH AND SPACE)</p> <ul style="list-style-type: none"> <li>• Animals and plants have adapted ways of surviving the changing seasons</li> <li>• These include <b>hibernating</b>, storing food, fattening up, <b>migration</b>, loss of leaves</li> <li>• Trees can be either <b>evergreen</b> or <b>deciduous</b>.</li> <li>• <b>Evergreen</b> trees keep their green leaves all year round.</li> <li>• <b>Deciduous</b> trees lose their leaves every autumn.</li> </ul>	<p><b><u>Year 1 Plants</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>identify and describe the basic structure of a variety of common flowering plants, including trees.</i></li> </ul> <p><b><u>Year 1 Seasonal Changes</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>observe changes across the four seasons</i></li> <li>• <i>observe and describe weather associated with the seasons and how day length varies</i></li> </ul> <p><b><u>Year 1 Plants</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</i></li> </ul>
<p><b>Year 2</b></p>		

	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
Year 3		
Year 4	<p><u>Living things</u></p> <p><b>Knowledge Block 1- Classifying living things</b></p> <ul style="list-style-type: none"> <li>Living things can be divided into groups based upon their characteristics</li> <li><b>Classification keys</b> help group, identify and name living things</li> <li>Animals can be classified as <b>vertebrates</b> (having a spine) or <b>invertebrates</b> (lacking a spine)</li> <li>In any habitat there are <b>food chains</b> and webs where <b>nutrients</b> are passed from one <b>organism</b> to another when it is eaten</li> <li>If the population of one organism in the chain or web is affected, it has a knock-on effect to all the others</li> </ul> <p><b>Knowledge Block 2- Life cycles</b></p> <ul style="list-style-type: none"> <li>Mammals, amphibians, insects and birds have different life cycles.</li> <li>Lifecycles vary in time depending on the species of animal- it can be as short as just a few weeks for insects, to up to 200 years for sea urchins. Larger animals often have longer life cycles but not always.</li> <li>All animal life cycles begin with growth and development followed by reproduction.</li> <li>Some animals undergo a complete <b>metamorphosis</b> as they grow. Metamorphosis is a process where animals undergo an abrupt and obvious change in the structure of their body and their behaviour.</li> <li>Some animals are eusocial. This means they live in colonies (groups) with one animal or group producing young and the others working to care for them.</li> </ul> <p><b>Knowledge Block 2- Environmental change</b></p> <ul style="list-style-type: none"> <li><b>Environmental change</b> affects different habitats differently</li> <li>Human activity significantly affects the environment</li> <li>Different organisms are affected differently by environmental change</li> </ul>	<p><u>Year 4 Living things and their habitats</u></p> <p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>recognise that living things can be grouped in a variety of ways</li> <li>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul> <p><u>Year 5 Living things and their habitats</u></p> <p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>describe the life process of reproduction in some plants and animals.</li> </ul>

Year 5	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
	<p><b><u>Fossils, geological time and classification</u></b></p> <p><b>Knowledge Block 1- What is evolution and how do we know it happened?</b></p> <ul style="list-style-type: none"> <li>• The Earth is very old. Around 4.2 <b>billion</b> years. We know this from dating rocks</li> <li>• Life first appeared on Earth around 3.8 billion years ago.</li> <li>• Life was, at first, very simple but over <b>millions</b> and millions of years life became more complex through the process of <b>evolution</b></li> </ul> <p><b>Knowledge Block 2- Evidence for evolution</b></p> <ul style="list-style-type: none"> <li>• There are many sources of evidence for evolution</li> <li>• <b>Fossils</b> are one of the main sources of evidence for evolution. They show when new organisms appear and when they go <b>extinct</b>.</li> <li>• Due to the nature of fossil formation and discovery, fossils only provide an incomplete record of evolution.</li> <li>• Scientists use fossils along with other pieces of evidence (<i>DNA, Embryology, comparative anatomy, artificial selection</i>) to work out how organisms have evolved</li> <li>• Fossils form when dead organisms are rapidly buried or leave an imprint and are turned to stone over a long period of time. If they survive in the Earth, they then have to be found by a <b>palaeontologist</b> who will study them.</li> </ul> <p><b>Knowledge Block 3: Classification of life</b></p> <ul style="list-style-type: none"> <li>• All living (and <b>extinct</b>) <b>organisms</b> are classified into groups based upon their physical features.</li> <li>• This includes animals, plants, fungi, and <b>microorganisms</b> like <b>bacteria</b>.</li> <li>• Within each of these broad groups, organisms are classified into small subgroups. Animals- invertebrates, mammals, birds, amphibians, reptiles and fish, Plants- flowering plants, ferns, conifers, moss.</li> <li>• Bacteria are a group of organisms that are not visible to the naked eye but are very abundant and have distinct physical features we can only see under powerful <b>microscopes</b>.</li> </ul>	<p><b><u>Year 5 Evolution and inheritance</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</i></li> </ul> <p><b><u>Year 6 Living things and their habitats</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>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</i></li> <li>• <i>give reasons for classifying plants and animals based on specific characteristics.</i></li> </ul>

Year 6	Substantive Knowledge from Learning Journeys	<i>National Curriculum Statutory Requirement</i>
	<p><b><u>Classification and Evolution</u></b></p> <p><b>Knowledge Block 1: Natural selection</b></p> <ul style="list-style-type: none"> <li>• <b>Evolution</b> is the change of physical form in a population over a long-time span</li> <li>• <b>Natural selection</b> is the process which controls that change.</li> <li>• In any <b>population</b> there is <b>variation</b> and <b>competition</b> for resources (food, water, mates).</li> <li>• Within that variation, organisms that have features which make them better <b>adapted</b> at securing food, water, and mates, are more likely to survive and produce <b>offspring</b> which have <b>inherited</b> those same successful features. Those that are not well adapted will eventually go <b>extinct</b>.</li> <li>• Over a long enough timeline all organisms in a population will have those successful features.</li> <li>• This is known as the <i>Theory of Evolution by Natural Selection</i> and was developed by <b>Charles Darwin</b> in 1859</li> </ul> <p><b>Knowledge Block 2: How Charles Darwin discovered the process of Evolution by Natural selection</b></p> <ul style="list-style-type: none"> <li>• Before Darwin, <b>Lamarck's</b> Idea of acquired characteristics was proposed. (Giraffes stretch their necks in life, which made their children have longer necks).</li> <li>• Darwin as a young man travelled around the world on the <b>HMS Beagle</b>. On this 5-year voyage he saw lots of things and recorded down lots of evidence which allowed him to work out how organisms change over time by a different mechanism of Natural selection</li> </ul>	<p><b><u>Year 5 Evolution and inheritance</u></b></p> <p><b><i>Pupils should be taught to:</i></b></p> <ul style="list-style-type: none"> <li>• <i>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</i></li> <li>• <i>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</i></li> </ul>