

HIAS OPEN ACCESS RESOURCE

# Hampshire Science Team

## Progression of Substantive Knowledge in Physics- Earth and Space

### Year 1-6

HIAS Science Team  
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# Overview

## This document contains...

A progressive list of the substantive knowledge within the Hampshire Science Learning Journeys with reference to the related National Curriculum statutory requirements.

## Points to consider when using this resource

The Learning Journeys provide schools with clearly sequenced substantive knowledge across chemistry, biology and physics. Where possible, the links to the National Curriculum statutory and/or non- statutory requirements have been identified. The Learning Journey 'Seasons' in Year 1, covers knowledge across the sciences of both biology and physics.

## Suggested sequence of learning

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1	Describing materials	Animal survival	Habitats	Seasons	Plants	
2	Animal life cycles	Changing materials	Pushes and pulls	Making New Plants		
3	Magnets	Animals, Skeletons and Movement	Solids, Liquids and Gases	Plants and their food production	Light	Rocks and soils
4	Mixtures and separating them	Digestion	Plant Reproduction	Making electrical circuits work	Living things	
5	Fossils, geological time and classification	Space and gravity	Making new substances	Forces that oppose motion	Circulation	
6	How light behaves	Classification and Evolution	Controlling electrical circuits	Sound		

BIOLOGY | CHEMISTRY | PHYSICS

# PHYSICS

## Earth & Space

	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
<b>Year 1</b>	<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> <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>(THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE BIOLOGY- VARIATION AND EVOLUTION)</p>	<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>
<b>Year 2</b>		
<b>Year 3</b>		
<b>Year 4</b>		

Year 5	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
		<p><b>Space and Gravity</b></p> <p><b>Knowledge Block 1: Our Solar system</b></p> <ul style="list-style-type: none"> <li>• A <b>Solar system</b> is a collection of <b>planets</b>, which <b>orbit</b> (a curved path) a <b>star</b>.</li> <li>• There are huge number of stars in space and therefore a huge number of solar systems</li> <li>• Our solar system consists of 8 planets, many of those planets have <b>moons</b> which orbit around them.</li> <li>• Earth's moon is not a planet but is a satellite which orbits Earth. It is around a quarter of the size of Earth.</li> <li>• As the Moon orbits the Earth, the Sun lights up different parts of it, making it seem as if the Moon is changing shape. We call these the phases of the moon.</li> <li>• The Moon doesn't emit (give off) light itself, the 'moonlight' we see is actually the Sun's light reflected off the lunar surface.</li> <li>• Our solar system can be represented with a model (see diagram), but it isn't possible to draw it to scale.</li> <li>• The planets and moons are <b>rotating</b> (spinning)</li> <li>• The time it takes one planet to rotate is called a <b>day</b>. On Earth this is 24 hours</li> <li>• The time it takes a planet to complete one orbit around its star is called a <b>year</b>. On Earth this is 365.25 days</li> <li>• The solar system is with a massive collection of stars called the <b>galaxy</b> (called the Milky way)</li> <li>• The Milky way is one of billions of galaxies in the <b>Universe</b>.</li> </ul> <p><b>Knowledge Block 2: What else is in the solar system?</b></p> <ul style="list-style-type: none"> <li>• Stars are huge balls of gas that produce vast amounts of light and heat.</li> <li>• <b>Asteroids</b> are lumps of rock that orbit a star (there are millions in between Mars and Jupiter)</li> <li>• <b>Comets</b> are objects that are made of Ice, which melts when they get closer to the sun leaving a tail.</li> </ul> <p><b>Knowledge Block 3: Gravity and its effects</b></p> <ul style="list-style-type: none"> <li>• <b>Gravity</b> is force of attraction between two objects with <b>mass</b> (a quantity of matter)</li> <li>• The bigger the mass the bigger force it exerts</li> <li>• Gravity works over distance but gets weaker as distance increases</li> <li>• Stars, planets, moons have a very large amount of mass. They exert a gravitational attraction on each other</li> <li>• Differences in gravity result in smaller mass objects orbiting around larger mass objects, e.g., planets around stars and moons around planets</li> </ul>
Year 6		

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