



Year 5: Science

Autumn Term – Physics Earth and Space

Scientist Focus: Aristotle, Ptolemy, Alhazen, Tusi, Copernicus and Galileo

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>In Year 5, pupils should be taught to describe the movement of the Earth and other planets relative to the sun in the solar system. They should also be taught to describe the movement of the moon relative to the Earth and describe the sun, Earth and moon as approximately spherical bodies. In addition, they should be taught to use the idea of the Earth's rotation to explain why we experience day and night and why the sun appears to move across the sky during the day.</p>	<ul style="list-style-type: none"> • what a sun is, what a solar system is, what a galaxy is and how our own solar system fits in to the wider universe • which planets make up our own solar system • knowledge of the inner and outer planets of the solar system including order, size, what the planet consists of, atmosphere, temperature, rotation and orbit • what the relationship is between the Earth and the sun in relation to night and day • what a time zone is and how the different time zones are arranged across the world • what the relationship is between the Earth and the sun in relation to seasons • how daylight hours change across the year in different places across the world • what a moon is and what the phases of our own moon are • the heliocentric and geocentric theories of the solar system • the flat and spherical Earth theories • the views of various astronomers over time: Aristotle, Ptolemy, Alhazen, Tusi, Copernicus and Galileo 	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments

Sequence:

This unit is the only required unit of study focussed on Earth and space in primary school. Pupils may have studied space in EYFS but aside from this, the links to previous learning are in Year 1 when pupils study seasons and in Year 3 pupils study light in science and biomes and climate zones in geography. From Year 1, pupils bring with them an understanding that here in the United Kingdom we experience four different seasons across the year and that the average hours of daylight change across the year. From Year 3, pupils bring with them a simple understanding of why we have night and day and how shadows change across the course of a day. The next unit in Year 5 will look at forces and in particular, gravity. This unit will support pupils in accessing that future content.

Autumn Term – Physics Forces

Scientist Focus: Isaac Newton and Galileo Galilei

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>In Year 5, pupils should be taught to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. They should also be taught to identify the effects of air resistance, water resistance and friction, that act between moving surfaces and recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p>	<ul style="list-style-type: none"> • the names of a range of different forces – gravity, friction, water resistance, air resistance, upthrust and magnetism • which forces are pushes and which are pulls • the difference between contact and non-contact forces • the difference between balanced and unbalanced forces • who Isaac Newton was and the role he played in helping us to understand forces • what 'matter' is, the difference between mass and weight and how we measure both • how friction works in the world around us • how air resistance works in the world around us • who Galileo Galilei was and the role he played in helping us to understand air resistance • how upthrust (or buoyancy) and water resistance act in water • what 'density' is and the relationship between density and whether an object is able to float • what levers, pulleys and gears are and what they can do to the strength and size of a force 	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments

Sequence:

Pupils were first introduced to forces in Year 3 where they learned about forces as pushes and pulls and were introduced to both gravity and friction in the simplest terms. Pupils were also introduced to magnets and magnetism as a force. This unit does not cover magnets in any depth however pupils already know what magnets are, that they have two poles, how they behave towards each other, that magnetism can act without contact and that some materials are magnetic whilst others are not. Pupils also bring to this unit an understanding of the solar system therefore when the solar system, the Earth, the sun, the moon and Jupiter are referred to in this unit, it is expected that pupils will be able to access this content.

Spring Term – Chemistry Properties and changes of materials

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>In Year 5, pupils should be taught to compare and group together everyday materials on the basis of their properties.</p>	<ul style="list-style-type: none"> • materials can be grouped based on their properties including hardness, solubility, transparency and conductivity 	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising

<p>They should also know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from that solution. Pupils should use knowledge of solids, liquids and gases to decide how mixtures might be separated and should be taught to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials. In addition, pupils should 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 usually irreversible. Within this, pupils should understand the changes associated with burning and the action of acid on bicarbonate of soda.</p>	<ul style="list-style-type: none"> • what we mean by 'dissolving' and whether certain substances dissolve in water to form a solution • whether the rate at which a substance dissolves can be altered by heat or stirring • mixtures can be sometimes be separated by sieving, filtering and/or evaporation • the difference between a reversible and an irreversible change • examples of reversible and irreversible changes • the impact of heating and cooling on a range of different materials • what happens when something burns • how new materials are usually formed after an irreversible change • the chemists and scientists who have created new materials that we use in our everyday lives 	<p>and controlling variables where necessary</p> <ul style="list-style-type: none"> • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments
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Sequence:

Pupils studied materials, their properties and their uses in Year 1 and Year 2. In Year 3 they built upon this knowledge through studying the properties of rocks and their uses. In further units of study in Year 3 and Year 4, pupils discovered and investigated the following additional properties of materials: opaque, transparent, translucent, magnetic, non-magnetic, conductor and insulator. In addition, pupils bring an understanding of solids liquids and gases and this knowledge of changing states is key to accessing this unit.

Summer Term – Biology

Living Things and their Habitats – Lifecycles

Scientist Focus: Jane Goodall and David Attenborough

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>In Year 5, pupils should be taught to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. They should also be taught to describe the life process of reproduction in some plants and animals.</p>	<ul style="list-style-type: none"> • the difference between sexual and asexual reproduction • the process of pollination and the role it plays in the lifecycle of a flowering plant • how plants reproduce both sexually and asexually • how different animals produce offspring • how lifecycles differ between animals 	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using

	<ul style="list-style-type: none"> • how and why gestation periods differ between animals • what a naturalist is and why both Jane Goodall and David Attenborough are considered significant 	<p>scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <ul style="list-style-type: none"> • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments
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Sequence:

Prior to this unit, pupils may have studied simple animal lifecycles in EYFS and will know about the lifecycle of a flowering plant from Year 3. In Year 2 pupils discovered that animals have offspring and in Year 4 pupils discovered that reproduction is one of the seven characteristics of life.

Summer Term – Biology
Animals including Humans – Growing old

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>In Year 5, pupils should be taught to describe the changes as humans develop as they grow old.</p>	<ul style="list-style-type: none"> • humans grow and change throughout the human lifecycle • how to place the stages of the human lifecycle on a timeline • the stages of development in babies and children • an introduction to what puberty is • how humans change from adulthood to old age • the changes experienced in old age 	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written

		forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments
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Sequence:

This unit builds on pupils' knowledge of the human body and its processes and functions. Prior to this unit, pupils have studied the skeletal, muscular and digestive systems. Pupils also know that humans, like all organisms, have a lifecycle in which growing and reproduction both play an integral part.