

Camelford Primary School Skills Progression

Science Pathway

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Subject Vision

At Camelford Primary School, our vision is to provide creative opportunities for our pupils to investigate our natural world by nurturing their ideas and inspiring our students to ensure they foster a love for the environment they live in; and to prepare them so they may contribute to the wider community to become responsible citizens.

Curriculum Intent

At Camelford Primary School, we recognise the importance of Science in every child's daily life. As one of the core subjects taught in primary schools, we aim to deliver a broad and balanced scientific curriculum from EYFS to the end of Key Stage 2 by following the 2014 National Curriculum for Science to ensure that all children develop scientific knowledge and understanding through the specific disciplines of biology, chemistry and physics. We aim to inspire our students to make informed decisions and think in scientific ways through our enquiry skills and approaches, so that they become increasingly confident in asking and answering questions and have a sense of wonder about the natural world around them.

Early Years Foundation Stage

Children begin to build wonder and excitement of their natural world through child-led exploration and discovery as they begin their learning journey.

By the end of EYFS, we aim for pupils to develop an awareness of their natural, local environment and start to make sense of the immediate world around them.

Understanding the World: World:

- making sense of seasonal changes through observations, asking questions, walks and planting bean seeds.
- start to develop an understanding of living things and their habitats through observing the life cycle of a butterfly and fruit tree.
- begin to make comparisons of materials they use in their learning (play dough, clay, bread dough and pastry); and understand what sinking and floating means through experimenting, questioning and observing.

Key Stage 1

During Key Stage 1 we aim to set the foundations for our pupils in their scientific journey. Continuing from their learning in EYFS, we encourage them to explore and observe more of the natural world around them; and for them to ask questions and start to express their views. We strive for pupils to begin working scientifically by classifying and identifying patterns through collection and recording. We introduce them to appropriate scientific equipment and build an awareness of working safely.

By the end of KS1, our pupils will have completed all areas of the Science KS1 National Curriculum, including:

- experience of different types of scientific enquiries through practical and hands-on activities.
- using a wide vocabulary appropriate to the specific science areas, including simple scientific language.
- asking and answering, through simple tests and observations, scientific relevant questions.
- understand how to perform simple tests, identify and classify, and gather and record data.

Key Stage 2

In Key Stage 2 we aim to build on pupil's prior knowledge and skills to further develop their scientific journey. We strive to develop their curiosity further by encouraging them to think creatively, to discuss their ideas and ask key questions that may guide their investigations. With guidance, they use specialist scientific equipment and are encouraged to take responsibility for working safely and have an understanding why.

By the end of KS2, our pupils will have completed all areas of the Science KS2 National Curriculum, including:

- planning and setting up different types of scientific enquiries, using their knowledge and science experiences to explore new ideas and different questions..
- regularly use relevant and a wide scientific vocabulary and language to discuss, communicate and justify their scientific ideas.
- make informed choices and decisions about appropriate observations to make, what measurements to take and with what equipment, and how to measure and record accurately.
- have developed confidence and familiarity through their scientific experiences and ideas so that they are prepared for their next steps into KS3.

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Implementation

The Science curriculum at Camelford Primary School has been developed as part of our two-year rolling programme and is taught within topics that encompass the whole-school theme each term. Following the National Curriculum, the long-term planning has been designed to enable pupils to learn new knowledge, skills and relevant vocabulary, whilst revisiting and revising those previously learnt. Medium term planning is supported by the subject lead and lessons are sequenced with clear and relevant learning objectives to ensure curriculum coverage and opportunities to work scientifically are embedded within the learning. Development Matters is followed in The Early Years Foundation Stage which aims for children to have an ‘Understanding of the World: the world’, by the end of the academic year. Science teaching at this stage encourages exploration and discovery and sets the foundations in which KS1 build on. Lessons are designed with different approaches and activities to motivate and engage pupils, including those with SEND; and opportunities to learn within and outside the classroom are embedded in practice, including local visits and links with our neighbouring secondary school, to inspire and encourage curiosity and wonder.

Impact

We aim for our children to have developed detailed scientific knowledge and skills, as well as continuing to be curious and retain their sense of wonder as they prepare for the next steps in their education and for their future. The quality of science education across the school is monitored and reviewed termly, including supportive learning walks, which allow for discussion and conversations with staff and pupils; book reviews; and long and medium-term planning of sequenced lessons followed by the teaching teams, ensures our pupils experience, enjoy and have the potential to excel in their science journey with us at Camelford Primary School. Displays, pupil voice, legacy projects and flipbooks are a celebration of our children’s high quality learning journey.

Science Pathway

The Science pathway shows clearly what the pupils will be learning as they progress on their journey at Camelford Primary School.

At Camelford Primary School we work on a 2-year rolling programme – Year A starting Sept 2020.

The table below includes the subject coverage which details when in the year the specific topics/areas are taught. These areas have been identified by the school team from the National Curriculum and beyond – ensuring they are relevant for the pupils at Camelford Primary School.

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The following documents detail the National Curriculum statements and the progression of skills within each of the given topic areas. Each progression of skills document shows expectations for ‘Working Towards’, ‘Working At’ and ‘Working Beyond’ the expected for that subject area.

How should this be used to help plan learning opportunities?

Teachers and subject leads must ensure that they use the progression statement to guide their planning, teaching and assessment. The 3 levels of attainment should be used to pitch the lesson and success criteria accurately; challenging pupils where appropriate with ‘Working Beyond’ and supporting others with ‘Working Towards’ criteria. However, due to our mixed age classes at Camelford, teachers must use their professional judgement by using the Working Towards and Working Beyond criteria when planning and setting learning opportunities.

How can this be used by subject leads and SLT?

	Autumn	Christmas	Spring		Summer	
	Autumn (10 weeks) Rebellion and Invasion: <i>Humanities focus</i>	Christmas (3wks) <i>Performance focus</i>	Spring 1 (5 wks) Civilization/British Values <i>Humanities focus</i>	Spring 2 (5 wks) Environmental Warrior <i>Science/school ethos focus</i>	Summer 1 (5 wks) Our community/Our World <i>Humanities focus</i>	Summer 2 (5 wks) Evolution of Man <i>Science focus</i>
Nursery	Understanding the World: World ‘What can we find in our garden in the Autumn?’ <i>I can tell you about three things that I can see in the Autumn.</i>		Understanding the World: World ‘What can we find in our garden in the Winter?’ <i>I can tell you three things I can see in the Winter.</i>	Understanding the World: World ‘What can we find in our garden in the Spring?’ <i>I can tell you what plants need to grow.</i>	Understanding the World: World ‘What lives in our garden in the Summer?’ <i>I can tell you five things that live in my garden.</i>	Understanding the World: World <i>I can tell you the names of five creatures which live in the sea.</i>
EYFS	Understanding the World: World <i>I can tell you about changes that are taking place in our environment during the Autumn.</i>	Understanding the World: World <i>I can compare bread dough, clay and pastry and say how these materials differ from each other.</i>	Understanding the World: World <i>I can talk about what causes water to freeze and to melt.</i>	Understanding the World: World <i>I can talk about the changes happening to our pear tree in the Spring.</i>	Understanding the World: World ‘How can we care for our garden?’ <i>I can tell you about the life cycle of a butterfly and a fruit tree.</i>	Understanding the World: World <i>I can make observations of animals and plants, talk about why some things occur and talk about changes.</i>
Years 1/2 A	Everyday Materials		<i>Plants introduction (Y1 curriculum)</i>	Plants (Y1 curriculum)	<i>Plants cont. (observations)</i>	Animals inc. Humans (Y1)
Years 1/2 B	Uses of Everyday Materials <i>*Significant person: Charles Macintosh</i> Seasonal Changes (Autumn/Winter)	Seasonal Changes (Winter)	Seasonal Changes (Winter/Spring)	Living things and their Habitats <i>Plants introduction (Y2 curriculum)</i> Seasonal Changes (Spring) <i>*Significant person: local meteorologist</i>	Plants (Y2 curriculum)	Animals inc. Humans (Y2) Seasonal Changes (Summer)
Years 3/4 A	Rocks <i>*Significant person: Mary Anning</i>		Forces and Magnets	Plants	<i>Plants cont. (observations)</i>	Animals inc. Humans (Y3)
Years 3/4 B	Light and Sound		States of Matter	Living Things and their Habitats	Electricity	Animals inc. Humans (Y4)
Years 5/6 A	Forces		Earth and Space	Living Things and their Habitats (Y5 curriculum)		Animals inc. Humans (Y5)
Years 5/6 B	Light and Electricity		Properties and Changes of Material	Living Things and their Habitats (Y6 curriculum) Evolution and Inheritance		Animals inc. Humans (Y6)

Subject leads and SLT should use the progression of skills and subject coverage documents to ensure the correct coverage is happening across the school, at the right times, that the areas being taught are relevant (as per the pathway) and that lessons are pitched to the

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right level ensuring maximum challenge. The journey of a child throughout the school (starting from Year 1 rotation A) should be carefully monitored to ensure their learning is progressive and varied.

National Curriculum Science Statement 2014

Purpose of Study P144

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims P144

The national curriculum for science aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics.
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them.
- are equipped with the scientific knowledge required to understand the **uses and implications of science**, today and for the future.

Scientific Knowledge and Conceptual Understanding P144

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of Science P145

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken Language P145

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Assessment P145

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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National Curriculum 2014 Key Stage 1 Science

Subject Content:

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. ‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

National Curriculum 2014 Working Scientifically Key Stage 1

Statutory Learning Intentions

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Non-Statutory

- Pupils in years 1 and 2 should explore the world around them and raise their own questions.
- They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions.
- They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships.
- They should ask people questions and use simple secondary sources to find answers.
- They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out.
- With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.

These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

National Curriculum 2014 Lower Key Stage 2 Science

Subject Content:

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary

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sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. ‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

National Curriculum 2014 Working Scientifically Lower Key Stage 2

Statutory Learning Intentions

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings

Non-Statutory

- Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them.
- They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys.
- They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.
- They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.
- They should learn how to use new equipment, such as data loggers, appropriately.
- They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.
- With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.
- With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.
- They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.
- Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.

These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.

National Curriculum 2014 Upper Key Stage 2 Science

Subject Content:

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should

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encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. 'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Pupils should read, spell and pronounce scientific vocabulary correctly.

National Curriculum 2014 Working Scientifically Upper Key Stage 2

Statutory Learning Intentions

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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 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.

Non-Statutory

- Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.
- They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.
- They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately.
- They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas.
- They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.
- They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.

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National Curriculum 2014 (p148 onwards)

Chemistry: Materials and Rocks

Everyday Materials Year 1

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- distinguish between an object and the material from which it is made - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - describe the simple physical properties of a variety of everyday materials - compare and group together a variety of everyday materials on the basis of their simple physical properties	- Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. - Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. Significant focus:

Uses of Everyday Materials Year 2

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	- Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing or different materials are used for the same thing. - They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Significant focus: Pupils will find out about Charles Macintosh who developed waterproof fabric, linking to their learning about Seasonal Changes. They will explore the suitability and properties of waterproof fabric and find out what makes it suitable for particular purposes, eg: a waterproof coat; and what creative use it has been used for, eg: umbrellas, tents.

Rocks Year 3

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties - describe in simple terms how fossils are formed when things that have lived are trapped within rock - recognise that soils are made from rocks and organic matter	- Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. - Pupils will research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. - Pupils will explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.

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	<u>Significant focus:</u> Pupils will look in particular at the geology of Cornwall (granite and slate), thinking about their simple physical properties and what they have been used for in the county. Pupils will also find out about the palaeontologist, Mary Anning and her significance in the discovery of fossils.
States of Matter Year 4	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- compare and group materials together, according to whether they are solids, liquids or gases - observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) - identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	- Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). - Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. <u>Significant focus:</u> Pupils will explore the effect of temperature on chocolate, measuring the temperature at which it changes state. (Heating and cooling). They will revisit their Geography learning of the water cycle from Year A, Summer Term 1 (Wild Water) <i>Note: teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.</i>
Properties and Changes of Materials Year 5	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets - know that 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 and the action of acid on bicarbonate of soda	- Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. - They should explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. <u>Significant focus:</u> will work scientifically by carrying out tests to answer the question, ‘Which materials would be the most effective for making a warm jacket for Shackleton?’ <i>Note: pupils are not required to make quantitative measurements about conductivity and insulation at this stage.</i>

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 1 and 2 (A)	Autumn (10 wks)	Pirates – ‘Land Ahoy!’ Everyday materials	Distinguish between an object and the material from which it is made	Identify the material from which an object has been made.	Correctly identify both object and the material from which it has been made.	Compare the same object made from different materials in terms of its effectiveness.	Object Material Wood Plastic Glass Metal Water Rock Paper Card Fabric Hard Soft Stretchy Shiny Dull Rough Smooth Bendy Waterproof/Not waterproof Absorbent/Not absorbent Transparent Opaque
			Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	Identify and name a limited range of everyday materials.	Identify and name a range of everyday materials.	Identify typical uses of a range of everyday materials.	
			Describe the simple physical properties of a variety of everyday materials	Recognise that a material has properties.	Describe a range of simple properties of a variety of everyday materials.	Compare the simple physical properties of a variety of everyday materials.	
			Compare and group together a variety of everyday materials on the basis of their simple physical properties	Compare and contrast two everyday materials	Classify a variety of everyday materials into groups based on their physical properties.	Suggest classification of everyday materials based on their physical properties.	
Year 1 and 2 (B)	Autumn (10 weeks)	The Great Fire of London – ‘London’s Burning’.	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	Identify and compare the suitability of some everyday materials (wood, metal, plastic, glass, brick, rock, paper and cardboard) for particular uses	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard. Select and justify a material for a particular use.	For particular materials in particular uses, suggest limitations as well as suitability.	Revisit vocabulary from Year 1 curriculum. Suitability Properties Force Squash Bend Twist Stretch Flexible Strong Weak Natural Man-made
			Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Identify that the shape of some objects can be changed.	Describe changes observed by applying force to solid objects (squashing, bending, twisting and stretching).	Identify that some changes are permanent and some only temporary and that this can influence their uses.	
Year 3 and 4 (A)	Autumn (10 wks)	‘Rollin’ Stone Age’	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	Identify that rocks vary in terms of appearance and physical properties. Group different rocks together according to their appearance and talk about observed simple physical properties.	Examine and test rocks, grouping them according to the results (appearance and simple physical properties).	Suggest uses for different kinds of rocks based on their properties.	Rock(s) –igneous, sedimentary, metamorphic Slate, granite, sandstone, chalk, limestone, quartz, marble, stone, pebble. Magma

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
			Describe in simple terms how fossils are formed when things that have lived are trapped within rock	Understand that fossils indicate the shape of a previous life form.	Explain how fossils are formed.	Explain the importance of studying fossils. What do they help us to learn?	Lava Sediment Permeable Impermeable Durable Dense/Density Fossil Fossilization Erosion Weathering Paleontology Soil -Top soil, Subsoil Clay Base rock Organic matter
			Recognise that soils are made from rocks and organic matter	Describe the appearance of soil, recognising that it is a mixture of materials.	Describe how soil is made.	Compare different soils in terms of composition.	
Year 3 and 4 (B)	Spring 1 (5 weeks)	'Mayan Mystery'	Compare and group materials together, according to whether they are solids, liquids or gases	Recognise the state of matter of different materials.	Compare and group materials according to their state of matter.	Recognise that some materials (ie: toothpaste) cannot be easily classified as solid, liquid or gas.	States of matter Solids Liquids Gases Particles Melt Freeze Solidify Evaporate /evaporation Condense /condensation Water cycle Precipitation Water vapour Temperature Degrees Celcius (°C)
			Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius	Recognise that some materials my change state.	Observe changes of state and research values of degrees Celsius which changes happen.	Suggest patterns in which kinds of materials change state at higher or lower temperatures.	
			Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	Relate the terms evaporation and condensation to water and understand what each term means.	Describe how evaporation and condensation happen in the water cycle, and how temperature affects evaporation.	Apply the relationship between rate of evaporation and temperature to everyday contexts.	
Year 5 and 6 (B)	Spring 1 (5 weeks)	'Ice Worlds'	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets	Compare and group together everyday materials based on their appearance and how they feel.	Test and sort a range of everyday materials based on their physical properties.	Suggest why those properties might influence the selection of those materials for certain uses.	Revisit vocabulary learnt in Year 4 curriculum Conductivity Insulator Transparency Dissolve Soluble Insoluble Separation Reversible Irreversible Sieve Mix
			Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	Know that some materials will dissolve in liquid to form a solution; talk about observations.	Describe how some materials, ie: sugar, will dissolve and can be retrieved.	Identify that some soluble materials are more soluble than others.	
			Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	Suggest how mixtures might be separated.	Justify separation techniques proposed, with reference to materials being separated.	Explain why a particular separation method might be more effective.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
			Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	Give reasons for the particular uses of everyday materials, including metals, wood and plastic.	Use evidence to justify the selection of a material for a particular purpose. (Metal, wood and plastic).	Suggest limitations of the uses of selected materials based on fair and comparative test results.	
			Demonstrate that dissolving, mixing and changes of state are reversible changes	Understand that some processes are reversible.	Show how the original material can be retrieved from each of these changes.	Classify various processes relating to materials as reversible or irreversible.	
			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 and the action of acid on bicarbonate of soda	Understand that burning is irreversible.	Identify reactants and products of chemical changes and recognise these as being irreversible.	Provide examples of when changes being irreversible is a positive (making bricks) or a negative (non-biodegradable plastic bags)	

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National Curriculum 2014 (p148 onwards) Physics: Light, Sound and Electricity

Light Year 3

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- recognise that they need light in order to see things and that the dark is the absence of light - notice that light is reflected from surfaces - recognise that light from the sun can be dangerous and that there are ways to protect their eyes - recognise that shadows are formed when the light from a light source is blocked by a solid object - find patterns in the way that the size of shadows changes	- Pupils should explore what happens when light reflects off a mirror or other reflective surfaces. They should think about why it is important to protect their eyes from bright lights. - They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. Significant focus: <i>Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</i>

Light Year 6

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- recognise 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 eye - 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 - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Significant focus: Pupils will investigate the relationship between light sources, objects and shadows by using shadow puppets, linked to their WW2 learning. They will investigate the different strengths of brightness. They will study light alongside electricity and will use their investigations of the brightness of lamps to support their thinking about how this affects shadows and what this may have looked like during the War.

Sound Year 4

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify how sounds are made, associating some of them with something vibrating - recognise that vibrations from sounds travel through a medium to the ear - 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	- Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments; and find out how the pitch and volume of sounds can be changed in a variety of ways. - Pupils will explore patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. Significant focus:

Electricity Year 4

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify common appliances that run on electricity - construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices.

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- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery - recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit - recognise some common conductors and insulators, and associate metals with being good conductors	Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. <u>Significant focus:</u> Pupils will study electricity alongside their DT unit, linking their enquiries using buzzers in a circuit to identify how sounds are made in this way. They will explore what happens to the volume of sound when adding more than one buzzer into a circuit. <i>Note: pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.</i>
Electricity Year 6	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- 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	- Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. - They should learn how to represent a simple circuit in a diagram using recognised symbols. <u>Significant focus:</u> Pupils will study electricity alongside light. In their study, they will investigate the brightness of a lamp with the number and voltage of cells used in a circuit. This will allow them to explore the effects on shadows as part of their light learning. <i>Note: pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.</i>

Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 3 and 4 (B)	Autumn (10 wks)	'Ruthless Romans'	Recognise that they need light in order to see things and that the dark is the absence of light	Identify that light is necessary for vision.	Relate being able to see to the presence of light.	Recognise that vision involves light travelling to the eyes.	Light Light source Dark Reflection Reflect Reflective Ray (light rays) Pupil Retina Shadow Opaque Translucent Transparent Direction
			Notice that light is reflected from surfaces	Identify that mirrors reflect light.	Describe how some objects reflect light.	Recognise that some surfaces are better at reflecting light than others.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
			Recognise that light from the sun can be dangerous and that there are ways to protect their eyes	Recognise that light from the sun can be dangerous. Suggest a way to protect the eyes.	Describe how and why our eyes should be protected from the sunlight.	Explain why sunlight can be dangerous and how types of protection work.	Torch Shine Sun Night Day Bright
			Recognise that shadows are formed when the light from a light source is blocked by a solid object	Recognise that light cannot pass through some objects.	Explain how shadows are made.	Suggest how light is travelling to form a shadow.	
			Find patterns in the way that the size of shadows changes	Identify that the size of shadows can be changed.	Describe how to change the size of a shadow.	Relate position of an object and position of a screen to the size of the shadow.	
Year 5 and 6 (B)	Autumn (10 wks)	'Put that light out!'	Recognise that light appears to travel in straight lines	Recognise that light travels from one point to another.	Represent light using straight line ray diagrams.	Recognise that even when light changes in direction, the path is still continuous.	Revisit vocabulary from Y3 curriculum. Ray Incident ray Reflected ray Refraction Spectrum Prism Law of Reflection Beam
			Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye	Recognise that some objects reflect light.	Represent light using straight lines to show light reflecting off objects and into the eye.	Refer to the idea that some objects may be better reflectors than others.	
			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	Describe how light travels from light sources to our eyes.	Explain (with diagrams) how we can see an object by light travelling into the eye.	Explain what is meant by the term, 'Law of Reflection'.	
			Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Relate the shape of shadows to the shape of the object that makes them.	Draw a diagram showing object, shadow and light to represent object shape to shadow shape.	Use a diagram to show that although the shadow shape is the same as objet shape, it may not be the same size. Suggest reasons for this.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 3 and 4 (B)	Autumn (10 wks)	'Ruthless Romans'	Identify how sounds are made, associating some of them with something vibrating	Identify how an object may vibrate.	Explain, with reference to vibrations, how an object makes a sound.	Group sound making objects in terms of how they make sounds.	Sound Hearing High Low Loud Quiet Vibrate /vibration Pitch Volume Ear/eardrum Distance Direction Source Mediums (solids, liquids, gases), particles Transmission
			Recognise that vibrations from sounds travel through a medium to the ear	Recognise that the ear detects vibrations.	Describe the role of a medium (solids, liquids, gases) in the transmission of sound.	Compare the effects of different media in terms of their ability to transmit sound.	
			Find patterns between the pitch of a sound and features of the object that produced it	Recognise that the pitch of a sound can be varied.	Explain, with reference to a particular object, how the pitch of a sound can be changed.	Identify generic features that cause the pitch of a note to be changed.	
			Find patterns between the volume of a sound and the strength of the vibrations that produced it	Recognise that the volume of a sound can be varied.	Explain, with reference to a particular object, how the volume of a sound can be changed.	Identify generic features that cause the volume of a note to be changed.	
			Recognise that sounds get fainter as the distance from the sound source increases	Suggest why some sounds are louder than others.	Describe the effect of moving away from the source of a sound.	Explain, with reference to examples, how sounds get fainter as the distance from the source increases.	
Year 3 and 4 (B)	Summer 1 (5 wks)	'Brilliant Britain'	Identify common appliances that run on electricity	Recognise that some appliances run on electricity.	List examples of appliances that run on electricity.	Compare and contrast appliances that run on mains electricity with those that run on batteries.	Electricity Appliances Circuit Battery/Batteries Crocodile clip Buzzer Motor Switch/switches Conductor Insulator Mains Socket Plug Bright Dim
			Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Construct a simple circuit.	Construct a simple circuit and name its components.	Construct a simple circuit and identify the components within it.	
			Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery	Understand that a complete circuit is needed for a circuit to operate.	Predict whether a particular arrangement of components will result in a bulb lighting.	Explain why certain arrangements will not result in the bulb lighting.	
			Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	Describe the function of a switch.	Predict how the operation of a switch will affect bulbs lighting.	Explain how altering the location of a switch affects the operation of the circuit.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
			Recognise some common conductors and insulators, and associate metals with being good conductors	Identify metal as a conductor.	Sort materials into conductors and insulators, identifying metals as conductors.	Investigate graphite as a conductor and relate to other materials.	
Year 5 and 6 (B)	Autumn (10 wks)	'Put that light out!'	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit	Recognise that changing the number and voltage of cells may alter the operation of a circuit.	Explain how number and voltage of cells affects the lamp or the buzzer.	Relate the number or voltage of cells to the number and operation of bulbs or buzzers that can be run from them.	Revisit vocabulary from Y4 curriculum. Circuit Cell/battery Current Amps Voltage Resistance Electrons Symbol (including diagrams to show the different representations)
			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	Identify the function and operation of different components.	Explain the use of switches, how bulbs can be made brighter and how buzzers can be made louder.	Explain the effects of changing the order of components in a circuit.	
			Use recognised symbols when representing a simple circuit in a diagram	Understand that components can be represented by symbols.	Represent a circuit that has been constructed using symbols.	Design circuits using symbols.	

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National Curriculum 2014 (p148 onwards)

Physics: Seasonal Changes, Forces, Earth and Space

Seasonal Changes Year 1

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies	- Pupils should observe and talk about changes in the weather and the seasons. - Pupils will look at day length as the seasons change. They will record their observations using a table over the school year (completing the table for 1 week in the following terms: autumn 1, autumn 2 close to the school holiday, spring 1/2 after the clocks go forward, and summer 1 near to the half term). <u>Significant focus:</u> Pupils will observe and describe the weather associated with the seasons throughout the year, making links with their Geography learning in spring 2 and seasonal patterns. They will use a chart to record rainfall and other weather observed. This can be completed alongside their enquiry into day length. <i>Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</i>

Forces and Magnets Year 3

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- compare how things move on different surfaces - notice that some forces need contact between two objects, but magnetic forces can act at a distance - observe how magnets attract or repel each other and attract some materials and not others - compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials - describe magnets as having two poles - predict whether two magnets will attract or repel each other, depending on which poles are facing	- Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). - They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe), looking for patterns in the way that magnets behave in relation to each other and what might affect this. For example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets. <u>Significant focus:</u> Pupils will work scientifically by comparing how different things move and grouping them. They will carry out tests to find out how far things move on different surfaces, gathering and recording data to find answers to their questions.

Forces Year 5

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object - identify the effects of air resistance, water resistance and friction, that act between moving surfaces	- Pupils will experience forces that make things begin to move, get faster or slow down. - They will look at the effects of air resistance (exploring falling objects), water resistance and friction (building on their learning from y3 Forces). - Pupils should explore the effects of levers, pulleys and simple machines on movement.

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recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	<u>Significant focus:</u> Pupils will work scientifically by designing and making a variety of model surfboards of different shapes and sizes, and carry out fair tests to determine which designs are the most effective. They will find out how Isaac Newton helped to develop the theory of gravitation.
Earth and Space Year 5	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study/ Non-Statutory
- describe the movement of the Earth, and other planets, relative to the Sun - describe the movement of the Moon relative to the Earth - 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	- Pupils should learn that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). - They should understand that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones). <u>Significant focus:</u> Pupils should be introduced to a model of the sun and Earth that enables them to explain day and night. They will work scientifically by comparing the time of day at different places on the Earth. Pupils will find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists Ptolemy and Copernicus. Where links can be made to the pupils learning about the ancient Egyptians and theories relating to their alignment of the pyramids to the stars and sun, then this should be considered during their learning of Earth and Space. <i>Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</i>

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 1 and 2 (B)	Autumn to Summer term (Whole year)	Various topic names during year.	Observe changes across the four seasons	Recognise that there are seasonal changes.	Recognise and describe seasonal changes.	Recognise changes within seasons as well as between seasons.	Seasons Day (daylight) Night Spring Summer Autumn Winter Weather: sun, rain, cloud, fog, wind, snow, hail, thunder, lightning. Months of the year Seasonal clothes
			Observe and describe weather associated with the seasons and how day length varies	Observe and describe familiar weather. Recognise that day length alters in different seasons.	Relate weather patterns and day length to seasons.	Make and test predictions relating to changing day length and weather patterns.	
Year 3 and 4 (A)	Spring 1 (5 wks)	'It's all Greek to Me!'	Compare how things move on different surfaces	Recognise that things may move differently across different surfaces.	Compare how an object, such as a toy car, will move differently on different surfaces.	Predict how an object will move on a different surface and suggest why.	Force Friction Surface Magnet Magnetic/Non-magnetic Magnetic field Poles Metal Iron Copper Aluminium Steel Brass Repel Attract Pull Push
			Notice that some forces need contact between two objects, but magnetic forces can act at a distance	Recognise that magnetic forces don't require physical contact.	Recognise the difference between contact forces and magnetic forces.	Explore how magnetic attraction and magnetic repulsion are affected by distance.	
			Observe how magnets attract or repel each other and attract some materials and not others	Identify that magnets affect each other.	Describe how magnets attract or repel each other and attract magnetic materials.	Explore whether some magnets are stronger than others.	
			Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	Recognise that some materials are magnetic and that others are not.	Group a variety of everyday materials based on testing whether they are magnetic or not.	Identify some applications of magnets and magnetic materials.	
			Describe magnets as having two poles	Recognise the term 'magnetic pole'.	Describe and identify the poles of a magnet.	Explore the similarities and differences between the two poles.	
			Predict whether two magnets will attract or repel each other, depending on which poles are facing	Recognise that magnets affect each other differently depending on which poles are facing.	Predict outcomes of a particular arrangement of magnets.	Apply ideas about the interactions of magnets to contexts such as toys.	
Year 5 and 6 (A)	Autumn (10 wks)	'Raid and Invade!'	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	Describe the effect of gravity on unsupported objects.	Explain that gravity causes unsupported objects to fall towards the Earth.	Recognise that gravity acts between all masses, ie: the sun and Earth.	Force Gravity Gravitational pull Attraction Repulsion Weight Mass Air resistance Water resistance Friction Buoyancy Streamlined Mechanisms Pulleys Cogs Gears Levers
			Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	Recognise that forces may resist motion.	Describe how air resistance, water resistance and friction may resist motion.	Identify ways in which forces that oppose motion may be useful or not useful.	
			Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Recognise that simple mechanisms transfer force.	Describe how some devices may turn a smaller force into a larger one.	Explain, with reference to everyday context, why a small force having a greater effect might be useful.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 5 and 6 (A)	Spring 1 (5 wks)	'Extraordinary Egyptians'	Describe the movement of the Earth, and other planets, relative to the Sun	Recognise that the planets move relative to the Sun.	Draw a diagram or use a model to describe planetary orbits.	Identify that the further away a planet is, the longer its orbit is around the Sun.	Planet(s): Mercury, Venus, Earth , Mars, Jupiter, Saturn, Uranus, Neptune and Pluto (dwarf planet). Sun Star Moon Solar system Sphere Spherical bodies Orbit Rotate /rotation Axis Revolve Spin North, South, East, West Astronomer Geocentric model Heliocentric model
			Describe the movement of the Moon relative to the Earth	Recognise that the Moon moves relative to the Earth.	Draw a diagram or use a model to describe the Moon's orbit around the Earth.	Relate the Moon's orbit of the Earth to the Earth's orbit of the Sun.	
			Describe the Sun, Earth and Moon as approximately spherical bodies	Sketch the outlines of the Sun, Earth and Moon as spheres.	Describe the Sun, Earth and Moon as spherical in shape.	Recognise that many planets are approximately spherical.	
			Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Relate day and night to the position of the Sun.	Use a diagram or model to show why the Sun seems to travel across the sky, and what causes day and night.	Explain, with reference to the Earth's rotation, the difference between daytime in the UK for example to night time in Australia.	

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National Curriculum 2014 (p148 onwards)

Biology: Plants

Plants Year 1

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees - identify and describe the basic structure of a variety of common flowering plants, including trees	- Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat (school grounds and local area). - They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, and stem). They will draw diagrams to show the different parts of plants, including trees. <u>Significant focus:</u> Pupils will observe the growth of a vegetable or fruit plant in class, such as a tomato or strawberry plant, keeping a record of how the plant changes over time. <i>Note: at this stage, pupils are not expected to understand in detail the requirements for what a plant needs to grow and survive.</i>

Plants Year 2

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- observe and describe how seeds and bulbs grow into mature plants - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Pupils should use the local environment throughout the year to observe how plants grow, building on their learning from the Y1 curriculum of study. <u>Significant focus:</u> Pupils will be introduced to the requirements of plants for germination, growth and survival. They will work scientifically by setting up a comparative test to show that plants need light, water and a suitable temperature to grow and stay healthy. They will observe and record over time, the growth of peas (from seed) and a flowering bulb, observing the different stages of growth. <i>Note: seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</i>

Plants Year 3

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - investigate the way in which water is transported within plants	Pupils will be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. <u>Significant focus:</u> Pupils will build on their learning from KS1 by comparing the effect of different factors on plant growth, for example, the amount of light or water.

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explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	They will work scientifically by observing how water is transported in plants, for example, by putting cut, white flowers (eg: carnations) into coloured water and observing how water travels up the stem to the flowers. They will explore pollination, seed formation and seed dispersal in the life cycle of a dandelion plant. <i>Note: pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.</i>
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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 1 and 2 (A)	Spring 2 (5 wks) *Cont. observations in summer 1	'Reduce, Reuse, Recycle'	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Identify and name a limited range of plants.	Identify and name a range of plants, including local plants.	Identify and notice similarities between various local plants.	Plants Wild plants Garden plants Deciduous Evergreen Weed Roots Stem Leaves Flowers Petals
			Identify and describe the basic structure of a variety of common flowering plants, including trees	Identify and describe the parts of a common flowering plant.	Identify and describe (label) the parts of a range of familiar flowering plants, including trees.	Identify and notice similarities in the structure of local flowering plants and trees.	
Year 1 and 2 (B)	Summer 1 (5wks)	'Cornwall, My Home'	Observe and describe how seeds and bulbs grow into mature plants.	Identify that seeds and bulbs grow into mature plants.	Describe stages of development of a full-grown plant.	Compare and contrast the growth patterns of different types of plants.	Seeds Bulbs Plants Shoot Sprout Water Soil Light /sunlight Temperature Nutrition Germination Dispersal
			Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Find out one thing that plants need to grow and stay healthy.	Explore and identify what plants need to thrive.	Identify the effects of a shortage of each of the things that plants need to grow and stay healthy.	
Year 3 and 4 (A)	Spring 2 (5wks)	'A Planet full of Plastic'	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	Identify different parts of a flowering plant. Describe the function of at least one part.	Describe what each part of the flowering part does.	Suggest why parts of a flowering part may vary in shape and size from one flowering plant to another.	Revisit basic vocabulary from Y1 (Roots, Stem/Trunk, Leaves, Flower, Petals) Fertilisation
			Explore the requirements of plants for life and growth (air, light, water, nutrients from soil,	Suggest how one of the requirements for plants to stay healthy could be explored.	Explain what all plants need to flourish and recognise how these requirements vary in amount.	Compare the requirements of different plants and link these to particular habitats.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
			and room to grow) and how they vary from plant to plant				Seed dispersal Germination Pollination Pollinator Nutrients Carpel – stigma, style, ovary Stamen – anther, filament Sepal Ovule Transport Absorb Evaporate
			Investigate the way in which water is transported within plants	Identify that water is transported within plants.	Explain with the aid of a diagram (or plant) how water is transported/carried up from the soil.	Suggest how the process of water transportation may vary from one type of plant to another.	
			Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Describe the processes of pollination, seed formation and seed dispersal.	Explain how pollination, seed formation and seed dispersal play a role in the reproduction of flowering plants.	Suggest how the process of pollination, seed formation and seed dispersal may vary from one type of plant to another.	

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National Curriculum 2014 (p148 onwards) Biology: Living Things and their Habitats; Evolution and Inheritance

Living Things and their Habitats Year 2

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- explore and compare the difference between things that are living, dead, and things that have never been alive - identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other - identify and name a variety of plants and animals in their habitats, including micro-habitats - describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	- Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. - Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'microhabitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). - Pupils will construct a simple food chain, understanding where an animal, including humans, get there food. <u>Significant focus:</u> Pupils will compare animals and plants in their local environment, observing microhabitats in the school's wooded area and learning about a seashore habitat (Polzeath). They will be able to describe the conditions of the different habitats and microhabitats, finding out how the conditions affect the number and types of plants and animals that live there. They will learn how living things depend on each other, for example, plants serving as a source of food and shelter for animals.

Living Things and their Habitats Year 4

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- recognise that living things can be grouped in a variety of ways - explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment - recognise that environments can change and that this can sometimes pose dangers to living things	Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. <u>Significant focus:</u> Pupils will explore examples of human impact (both positive and negative) on an ocean environment, linking their learning to plastic pollution and finding out about the work and significance of David Attenborough.

Living Things and their Habitats Year 5

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- 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	Pupils should study and raise questions about their local environment throughout the year. <u>Significant focus:</u> Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. They will try to grow

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	new plants from different parts of the parent plant, for example, from seeds or by taking cuttings. Pupils will observe and compare the life cycles of a mammal, an amphibian, an insect and a bird in their local environment, where possible, asking questions and suggesting reasons for similarities and differences.
Living Things and their Habitats Year 6	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- 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 - give reasons for classifying plants and animals based on specific characteristics	Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. <u>Significant focus:</u> Pupils will learn about the work of scientist, Carl Linnaeus, a pioneer of classification. They will use classification systems and keys to identify some plants and animals in their local environment. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils will be learning this unit alongside Evolution and Inheritance, which may raise questions and links between classification systems and adaption.
Evolution and Inheritance Year 6	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- 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 in different ways and that adaptation may lead to evolution	Building on what they learned about fossils in the topic on rocks in the year 3 curriculum, pupils should find out more about how living things on Earth have changed over time. <u>Significant focus:</u> Pupils will find out about the work of Charles Darwin and how he developed his ideas on evolution. Pupils will work scientifically by observing and raising questions about local animals and plants and how they are adapted to their environment. They will consider and compare how some living things are adapted to survive in extreme conditions, for example cactuses, penguins and camels. <i>Note: at this stage, pupils are not expected to understand how genes and chromosomes work.</i>

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 1 and 2 (B)	Spring 2 (5 wks)	'Home Sweet Habitat'	Explore and compare the difference between things that are living, dead, and things that have never been alive	Identify some characteristics that living things need to keep them alive.	Identify and describe some characteristics that living things need to keep them alive.	Explore and describe the life processes that are common to all living things.	Living/Alive Never living/never alive Dead Habitat Microhabitat Environment Depend Survive Food chain Prey Source Animals Humans Minibeasts Plants Trees Branch Trunk
			Identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other	Identify that a habitat supplies living things with what they need.	Explain how, for a named plant or animal, it gets what it needs from its habitat and other living things that are there.	Explain why there may be a limit as to how many of a certain living thing can live in a particular area.	
			Identify and name a variety of plants and animals in their habitats, including micro-habitats	Identify a limited range of living things in their habitats.	Identify a range of living things in habitats of various sizes.	Identify a range of living things and suggest why they might be found in that habitat.	
			Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	Identify a predator/prey relationship.	Construct a simple food chain and identify what is eating what.	Suggest, within a simple food chain, what might happen if one of the living things becomes scarce.	
Year 3 and 4 (B)	Spring 2 (5 wks)	'The Big Blue Planet'	Recognise that living things can be grouped in a variety of ways.	Suggest a way of grouping things, eg: sort shells by colour.	Suggest different ways of sorting the same group of living things, eg: grouping birds according to where they live, what they eat and size of adults.	Suggest why some ways of grouping living things may be more useful than others, eg: why grouping by number of legs is an easy aid to identification.	Vertebrate Invertebrate Amphibians Fish Birds Mammals Reptiles Classify Flowering Non-flowering Environment Condition Food chain Consumer Producer Predator Prey
			Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	Use classification keys to group and identify members from a small group of living things.	Use classification keys to group and identify members from a range of familiar and less familiar living things.	Devise own classification key to group living things.	
			Recognise that environments can change and that this can sometimes pose dangers to living things	Describe how environments might change.	Describe how living things are threatened by changes to environment.	Describe examples of living things adapting to environmental change, eg: urban foxes, and examples of extinction due to environmental change.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 5 and 6 (A)	Spring 2 (5 wks)	Act Locally, Think Globally!'	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	Explain what a life cycle is, eg: kittens grow into cats, have kittens and eventually die.	Identify similarities and differences in two different life cycles.	Suggest similarities in the life cycles of a number of vertebrates, eg: comparison of dog, human and bird embryos.	Life cycle Life process Reproduction Fertilisation Metamorphosis Pollination Carpel – stigma, style, ovary Stamen – anther, filament Sepal Ovule
			Describe the life process of reproduction in some plants and animals	Describe the life process of reproduction in humans.	Describe in sequence the stages of reproduction in some plants and animals.	Compare the reproduction process in animals and plants, eg: compare and contrast fertilisation.	
Year 5 and 6 (B)	Spring 2 (5 wks)	'One Planet, One Chance'	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	Identify the broad groups into which living things are classified, eg: mammals.	Use similarities and differences in observable features to describe how living things should be grouped, eg: a cat is a mammal because it is warm blooded and gives birth to live young.	Explore why some living things (ie: the duck billed platypus) don't neatly fit into one group.	Micro-organisms Classification Characteristics Vertebrates Invertebrates
			Give reasons for classifying plants and animals based on specific characteristics	State how plants and animals can be classified using specific characteristics.	Explain why certain things are useful in classifying living things, eg: backbones in animals and flowers in plants.	Explain why other features are less useful as a basis for classification, eg: size and colour.	
Year 5 and 6 (B)	Spring 2 (5 wks)	'One Planet, One Chance'	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 fossils provide information about living things from millions of years ago, eg: understand that they are preserved remains of extinct living things.	Use fossils as evidence that living things have changed over time, eg: explain that these have died out and others have taken their place.	Suggest possible reasons for changes to living things over time.	Fossil Offspring Inheritance Characteristics Adaption Evolution
			Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents	Recognise that living things produce offspring of the same kind, but normally offspring vary, eg: that puppies have common features but are not identical.	Recognise that offspring vary from each other and from their parents.	Recognise that selective breeding may result in offspring with certain features, eg: pedigree dogs with a certain shape or colour.	
			Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	Identify ways in which certain animals and plants are adapted to suit their environment in different ways.	Describe examples of a living thing that has adapted to live in a particular habitat and evolved as a result, eg: a polar bear or a cactus.	Give examples of living things that have evolved in different ways.	

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National Curriculum 2014 (p148 onwards) Biology: Animals, including Humans

Animals, including Humans Year 1

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals - identify and name a variety of common animals that are carnivores, herbivores and omnivores - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. <u>Significant focus:</u> Pupils will learn and become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. They will learn the terms carnivore, herbivore and omnivore and group common animals according to what they eat. Pupils will observe animals in their local environment (pets, school grounds) as well as using online resources and photographs. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils will learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.

Animals, including Humans Year 2

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- notice that animals, including humans, have offspring which grow into adults - find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. <u>Significant focus:</u> Pupils will learn about themselves and their growth from babies to toddlers to the children they are now. They will use photographs of themselves, where possible, to identify and understand changes. They will consider what their basic needs are and how these have changed over time. Pupils will learn about the importance of exercise, healthy foods and hygiene. Pupils will compare the growth of humans to the life cycle of a butterfly.

Animals, including Humans Year 3

Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat - identify that humans and some other animals have skeletons and muscles for support, protection and movement	Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.

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	<u>Significant focus:</u> Pupils will work scientifically by identifying and grouping animals with and without skeletons, observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They will learn about the different food groups and how they keep us healthy, and design meals based on what they find out.
Animals, including Humans Year 4	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- describe the simple functions of the basic parts of the digestive system in humans - identify the different types of teeth in humans and their simple functions - construct and interpret a variety of food chains, identifying producers, predators and prey	Pupils should be introduced to the main body parts associated with the digestive system, for example: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine, and explore questions that help them to understand their special functions. <u>Significant focus:</u> Pupils will learn about the digestive system through images and practical experiments. They will learn the different types of teeth and their function; finding out what damages teeth and how to look after them. Pupils will develop their learning further about food chains (from the Y2 curriculum, Living things and their Habitats) by understanding and identifying producers, predators and prey.
Animals, including Humans Year 5	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- describe the changes as humans develop to old age - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function <i>*Note: This statement is from the Y6 curriculum statements but is included in both Years to ensure coverage of substances (drugs and alcohol) in both Year A and B.</i>	Pupils will develop their learning from the Y2 Animals, including Humans study where they learnt about growth. <u>Significant focus:</u> Pupils will learn about themselves and consider the changes they will experience as they continue to grow into adolescence and adulthood, including puberty and reproduction. They will research the gestation periods of other animals and compare them with humans. Pupils will learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.
Animals, including Humans Year 6	
Statutory Learning Intentions - pupils should be taught about:	CPS chosen areas of study
- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - describe the ways in which nutrients and water are transported within animals, including humans	Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. <u>Significant focus:</u> Pupils will study the main parts of the circulatory system and where possible have practical experience. Pupils will learn how to keep their bodies healthy, developing their learning further about healthy lifestyle choices, including diet and exercise. They will think about how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 1 and 2 (A)	Summer 2 (5 wks)	'All Creatures Great and Small'	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	Identify and name a limited number of common animals.	Name a variety of common animals,	Identify and describe common features of the main groups of vertebrates.	Animals Fish Amphibians Reptiles Birds Mammals Carnivores Herbivores Omnivores Humans Senses Hearing - hear Sight - see Touch - feel Taste Smell Eye Ear Nose Mouth Hand Foot Arm Leg Head Neck Knee
			Identify and name a variety of common animals that are carnivores, herbivores and omnivores	Recognise the difference between carnivores, herbivores and omnivores.	Identify and group a range of familiar animals according to whether they are carnivores, herbivores or omnivores.	Suggest why an unfamiliar animal might be a carnivore, herbivore or omnivore.	
			Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	Identify key features of one or two common animals.	Identify key features of a range of common animals.	Compare key features of familiar and unfamiliar animals.	
			Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	Describe each of the human senses.	Relate each of the human senses to organs.	Suggest how the senses are used in an activity such as eating.	
Year 1 and 2 (B)	Summer 2 (5 wks)	'Incredible Me'	Notice that animals, including humans, have offspring which grow into adults	Recognise that all animals, including humans, have offspring.	Describe the relationship between adult animals and their offspring.	Compare and contrast adults and their offspring for different animals.	Life cycle Humans (baby, toddler, teenager, adult) Young Parent Growth Survival Exercise Hygiene Healthy Unhealthy Diet Germ Medicine Safety
			Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)	Identify the basic needs of animals, including humans, for survival (water, air and food).	Identify and describe the basic needs of animals, including humans, for survival (water, air and food).	Suggest how the basic needs of animals, including humans, influences their choice of habitat.	
			Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Recognise the importance to humans of exercise, a healthy diet and hygiene.	Describe the importance of a healthy diet, exercise and good hygiene.	Suggest the effects of a poor diet, hygiene and little exercise.	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 3 and 4 (A)	Summer 2 (5 wks)	'A Body full of Bones'	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat	Identify that animals, including humans, need the correct nutrition.	Describe why animals depend on the correct nutrition.	Explain why a varied diet is important.	Nutrition Nutrients Food groups – Carbohydrates, Protein, Dairy, Fibre, Fats – saturated and unsaturated. Meat, Vegetables, Fish, Cereals, Sugars, Fruits, Starches. Vitamins Minerals Vertebrate Invertebrate Skeleton Bone Ribs Spine Skull Muscles Tendons Joints Contract Relax
			Identify that humans and some other animals have skeletons and muscles for support, protection and movement	Recognise that humans and some other animals have skeletons and muscles.	Explain which part of the skeleton provide support and protection, and how they allow for movement.	Compare the ways that the skeletons of different animals provide support, protection and movement.	
Year 3 and 4 (B)	Summer 2 (5 wks)	'Food, Glorious Food'	Describe the simple functions of the basic parts of the digestive system in humans	Describe the purpose of the digestive system in humans.	Identify what each of the principal organs in the digestive system does.	Explain why the simple functions of the basic parts of the digestive system in humans are necessary.	Digestive system Digest Oesophagus Stomach Small intestine Large intestine Rectum Teeth/tooth Incisor Canine Molar Premolar Root Decay Producer Predator Prey
			Identify the different types of teeth in humans and their simple functions	Recognise that humans have different types of teeth.	Recognise and describe the function of the different types of teeth in humans.	Explain why humans have different types of teeth.	
			Construct and interpret a variety of food chains, identifying producers, predators and prey	Use a food chain to represent and the roles of producers, predators and prey.	Use a food chain to understand and describe the roles of producers, predators and prey.	Suggest what might happen in a food chain if the population of one of the organisms changes. (Increases or decreases).	

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Year Group Cohort	Term (length)	Topic Name	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary
Year 5 and 6 (A)	Summer 2 (5 wks)	'This is my Life'	Describe the changes as humans develop to old age	Identify that people change as they age, eg: recognise differences in appearance, abilities etc.	Describe the changes to humans as they develop to old age.	Suggest why some of the changes that take place in humans happen.	Adolescence Puberty Reproduction Fertilisation Gestation Adulthood Life expectancy Growth Drug Alcohol Substances
			Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Recognise that diet, exercise, drugs and lifestyle impact on the way the body functions. Eg: knowing that exercise changes the body.	Suggest how their bodies are affected by substances and actions, eg: that a high fat diet coupled with lack of exercise is likely to lead to obesity.	Explain how decisions about lifestyle can affect the quality of life, eg: excessive consumptions of convenience foods; the impact of some drug and other substances to their bodies.	
Year 5 and 6 (B)	Summer 2 (5 wks)	'Staying Alive!'	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	Name the main parts of the human circulatory system, eg: heart, arteries, veins.	Describe what the heart, blood and blood vessels do. Eg: carry oxygen to all parts of the body.	Explain some characteristics of the heart, blood vessels and blood, eg: explain that the arteries are thicker because they carry blood at a higher pressure.	Circulatory system Circulation Heart Heartbeat Pulse (Pulse rate) Lung Breathe Arteries Veins Blood and blood vessels Capillaries Alveoli Villi (villus) Kidneys Liver Drug Alcohol Substances
			Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Recognise that diet, exercise, drugs and lifestyle impact on the way the body functions. Eg: knowing that exercise changes the body.	Suggest how their bodies are affected by substances and actions, eg: that a high fat diet coupled with lack of exercise is likely to lead to obesity.	Explain how decisions about lifestyle can affect the quality of life, eg: excessive consumptions of convenience foods; the impact of some drug and other substances to their bodies.	
			Describe the ways in which nutrients and water are transported within animals, including humans	Describe that nutrients and water are transported within animals, including humans.	Describe, with diagrams, the route that water takes within animals, eg: through the human body	Compare the ways in which nutrients and water are transported in two animals that are quite different.	

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National Curriculum 2014 <u>Working Scientifically Key Stage 1</u>	
Statutory Learning Intentions	Non-Statutory
During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: - asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions.	- Pupils in years 1 and 2 should explore the world around them and raise their own questions. - They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. - They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. - They should ask people questions and use simple secondary sources to find answers. - They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. - With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. <i>These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.</i>

Working Scientifically Concepts	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary Questions Sentence Stems
Asking Questions	Ask simple questions and recognise that they can be answered in different ways	Ask simple questions, with support, and talk about ways of gathering evidence to answer a question.	Ask simple questions that can be tested and suggest different ways of answering a question.	With support, develop relevant, testable questions and plan an enquiry, such as a comparative or fair test.	Questions Answers Observe Equipment Test Gather Record Rainbow Questioning: Red, Orange and Yellow (see separate document) I think.... I noticed that.... I can see..... I wonder
Measuring and Recording	Observe closely, using simple equipment	Examine closely with support and talk about observations.	Observe and examine closely using simple equipment such as a hand-magnifying lens. Make notes on key features observed.	Observe closely using simple equipment and suggest useful measurements (examining a leaf and suggest measuring its length).	
	Perform simple tests	Perform simple tests with support.	Perform simple tests, eg: setting up comparative tests for suitable plant growth conditions.	Make suggestions on suitable simple tests to perform.	
	Identify and classify	Identify some findings from an enquiry.	Identify and group key findings from an enquiry.	Suggest what the enquiry shows through identification and classification.	
	Gather and record data to help in answering questions	Collect data and record findings (with support as necessary).	Collect and record data relevant to answering questions.	Begin to recognise patterns in recorded data and make suggestions as to why this may be.	
Concluding	Use their observations and ideas to answer questions	With support, use their observations to answer some questions.	Answer questions using data from observations and their ideas.	Produce a simple conclusion based on answers to questions from an enquiry.	

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National Curriculum 2014 <u>Working Scientifically Lower Key Stage 2</u>	
Statutory Learning Intentions	Non-Statutory
During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: - asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings	- Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. - They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. - They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. - They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. - They should learn how to use new equipment, such as data loggers, appropriately. - They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. - With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. - With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. - They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. - Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences. <i>These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.</i>

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Working Scientifically Concepts	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary Questions Sentence Stems
Asking Questions	Ask relevant questions and use different types of scientific enquiries to answer them	With support, develop relevant, testable questions and plan an enquiry, such as a comparative or fair test.	Ask relevant, testable questions and plan investigations using different types of scientific enquiries to answer them. Eg: observations over tie, comparative or fair tests, surveys.	Ask a range of relevant, testable questions and answer questions using evidence from different types of scientific enquiries.	Questions Answers Observe Equipment Test Gather Record Classify Enquiry Comparative test Fair test Accurate Measurement Data Conclusions, Predictions Similarities Differences Rainbow Questioning: Red – Blue (see separate document) I think.... I noticed that..... I wonder They are similar because.... They are different because.... I conclude....because.... I predict.....because.....
	Set up simple practical enquiries, comparative and fair tests	With support, set up comparative and fair tests.	Set up simple practical enquiries, comparative and fair tests, explaining their relevance to the question being asked.	Set up simple practical enquiries, comparative and fair tests, explaining their relevance to the question being asked. With support, can recognise and start to understand variables	
Measuring and Recording	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	With support, make observations using different types of equipment and take accurate measurements using standard units.	Make observations using a range of equipment as instructed and take accurate measurements using standard units.	Make systematic and careful observations, selecting and using a range of equipment, relevant to the enquiry and take precise and accurate measurements.	
	Gather, record, classify and present data in a variety of ways to help in answering questions	With support, gather and present data as instructed to help in answering questions.	Use a variety of ways (some as instructed) to gather, record, classify and present data to help in answering questions.	Suggest different ways to gather, record, classify and present data to help in answering questions.	
	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	With support, draw and label diagrams using simple scientific language and complete bar charts and tables with keys.	Record findings using drawings, diagrams, bar charts and tables, as instructed where appropriate, using simple, relevant scientific language.	Record evidence, selecting and choosing the most suitable method, (drawings, diagrams, bar charts, tables), using scientific language.	
Concluding and Evaluating	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	In discussion, explain orally the results from enquiries and with support, understand how to display or present them.	Use evidence from enquiries to give a written explanation, making suggestions of suitable ways to display or present results and conclusions.	Report on key findings from enquiries using written explanations and select appropriate ways to display or present results and conclusions.	
	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	In discussion, talk about simple conclusions and ask further questions from results of an enquiry.	Make simple conclusions from results of an enquiry and think about how they could make improvements to raise further questions.	Use results to draw conclusions and make predictions. Suggest further relevant comparative or fair tests that will raise further questions.	
	Identify differences, similarities or changes related to simple scientific ideas and processes	With support, identify patterns related to simple scientific ideas.	Recognise patterns related to scientific ideas and processes and be able to explain these.	Arrange data to show clear key characteristics of differences, similarities or changes.	
	Use straightforward scientific evidence to answer questions or to support their findings	With support, use evidence to answer questions and produce a simple conclusion.	Use evidence to produce a conclusion in answer to questions or their findings from an enquiry.	Explain, with some amount of detail, how the scientific evidence supports their conclusion.	

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National Curriculum 2014 <u>Working Scientifically Upper Key Stage 2</u>	
Statutory Learning Intentions	Non-Statutory
During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: ▪ 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 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.	▪ Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. ▪ They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. ▪ They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. ▪ They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. ▪ They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. ▪ They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. <i>These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.</i>

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Working Scientifically Concepts	National Curriculum Statement	Working Towards	Working At	Working Beyond	Vocabulary Questions Sentence Stems
Asking Questions	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	With support, plan comparative and fair tests to answer questions and recognise variables within the scientific enquiry.	Plan different types of scientific enquiries to answer questions. Recognise and manage variables as necessary.	Suggest which type of enquiry is likely to be more successful in answering a question. Identify and control variables but recognise that some variables cannot be easily managed.	Questions Answers Observe Equipment Test Gather Record Classify Enquiry Comparative test Fair test Accurate Measurement Data Conclusions, Predictions Similarities Differences Controlling variables Precision Causal relationship Evidence Rainbow Questioning: Red – Indigo (see separate document) I think.... I noticed that..... I wonder ... They are similar because.... They are different because.... I conclude....because.... I predict.....because..... The evidence shows.....
Measuring and Recording	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	After discussion, select appropriate equipment and take measurements with accuracy, including repeated readings.	Use a range of scientific equipment relevant to the enquiry to take measurements with increased accuracy and precision, and know when to include repeated readings.	Explain why the scientific equipment selected may provide more accurate and precise readings and measurements. Explain why repeated readings are not always appropriate.	
	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Draw simple labelled scientific diagrams. With support, record data using classification keys, tables, scatter and line graphs.	Select and use appropriately, a range of various ways to record complex evidence.	Select and use appropriately, a range of various ways to record complex evidence, explaining chosen method to present findings.	
Concluding and Evaluating	Use test results to make predictions to set up further comparative and fair tests	In discussion, make predictions based on test results and suggest further comparative and fair tests.	Use evidence to make predictions that would develop the enquiry, setting up further comparative or fair tests.	Evaluate which further comparative or fair test would be more valuable in developing the enquiry more.	
	Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	Present evidence from enquiries in oral and written forms to form a conclusion. With support, identify causal relationships and understand why some results might not be entirely trustworthy.	Present evidence, selecting appropriate oral and written forms, from an enquiry and conclude, identifying causal relationships and the degree of trust in results.	Evaluate the best way to present key evidence and form a conclusion, identifying causal relationships and explaining the degree of trust in results.	
	Identify scientific evidence that has been used to support or refute ideas or arguments.	Show how evidence supports the conclusion.	Identify how an idea or argument is supported or refuted by scientific evidence and discuss.	Suggest how other factors other than evidence can support or refute ideas and arguments.	

New Assessment Objectives for Working Scientifically September 2022 onwards

	EYFS	KS1	Lower KS2	Upper KS2
AO1	I can remember some basic facts.	I can remember a wide range of basic facts.	I can remember key facts about some areas of science.	I can remember key facts about most areas of science.

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Remember	I can use a few key words.	I can use a few key words for a given topic studied. I can realise simple or obvious effects of science	I can use key words for a given topic studied. I can realise simple or obvious effects of science in society.	I can usually use appropriate terminology in answers (key words and phrases) I can identify scientific evidence that has been used to support or refute ideas or arguments.
AO2 Applying knowledge	I can test my own ideas. I can make a prediction. I can use my senses and look closely. I can use equipment and tools carefully. I can recognise some environments that are different from the one I live in. I can create simple representations of people and objects. I can talk about things like plants, animals, natural and found objects. I can understand the effect of changing seasons on the natural world around me.	I can perform simple tests. I can make a prediction and explain my thoughts. I can use simple equipment to make measurements.	I can make a prediction and give valid reasons for it. I can set up my own simple tests. I can make systematic and careful observations. I can use different equipment to measure accurately in standard units. I can use scientific evidence to answer questions and to support my findings.	I can make a prediction and give valid reasons for it. I plan different types of scientific enquiries to answer questions. I can set up fair tests when necessary. I can decide what observations and measurements to make. I can use different scientific equipment to measure with precision. I can take repeat readings when appropriate.

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AO3 Analyse & Evaluate	I can question why things happen. I can explore the natural world around me. I have my own ideas. I notice similarities and differences.	I can ask simple questions. I can begin to recognize patterns and relationships. I can observe changes over time. I can talk about what I have found out. I observe closely. I can compare things through sorting and grouping. I can recognize that questions can be answered in different ways.	I can ask my own questions and use different ways to answer them. I can explain what I have found out using speaking and writing. I can draw simple conclusions and make predictions for new values. I can suggest improvements and raise further questions. I can identify differences, similarities or changes related to simple scientific ideas and processes.	I can ask different kinds of questions. I can use results to make predictions and set up more tests (including fair tests). I can report and present findings using speaking and writing, including display and presentations.
AO4 Scientific literacy	I can begin to use scientific vocabulary.	I can use simple scientific vocabulary. I can gather and record simple data in different ways.	I can use relevant scientific vocabulary. I can gather, record, classify and present data in different ways including drawings, labelled diagrams, keys, bar charts and tables.	I can use relevant scientific vocabulary and illustrations. I can decide how to gather data and results. I can use scientific diagrams, labels, classification, keys, tables, scatter, bar and line graphs.