



'SMALL BUT MIGHTY'

"The kingdom of heaven is like a mustard seed, which a man took and planted in his field. Though it is the smallest of all seeds, yet when it grows, it is the largest of garden plants and becomes a tree, so that the birds come and perch in its branches."
Matthew 13 31-32

COMPASSION

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COURAGE

*At Kennet Valley School we deliver an ambitious, knowledge-based Science curriculum that aims to **inspire pupils' curiosity** to know more about the world around them.*

Our Science curriculum helps pupils to develop independence and teamwork. It provides them with opportunities to revisit and refine key skills; to deepen their knowledge through links to prior learning; to learn outside of the classroom when appropriate and to devise their own scientific enquiries.

*By learning about **Key Scientists** from around the world, the children learn how attitudes can influence scientists. The children learn that many Scientists have been challenged when first sharing their ideas and this is why evidence is so crucial.*

*By learning **Key Scientific Vocabulary** the children will be able to express their ideas clearly and accurately. They will be able to engage in debate and discussion, communicating clearly and confidently with others.*

*By learning **Key Scientific Facts** the children will be able to see connections between different aspects of the science curriculum, including between the three science disciplines. They will be able to support their reasoning with evidence and develop their own lines of enquiry.*

*By learning the **Key Enquiry Skills** of: asking questions; making predictions; setting up tests; observing and measuring; recording data; interpreting and communicating results and Evaluating the children will be able to conduct a variety of enquiry types accurately.*

*Through the **Key Enquiry Types** of: comparative fair testing; making observations over time; identifying, grouping and classifying; pattern seeking; problem solving; research and evaluating, the children will learn that different enquiries call for different methods and will learn to choose appropriately for themselves.*

Finally, as a result of their learning in Science, children at Kennet Valley School will have a greater understanding of how our scientific knowledge has developed over time, the process of scientific

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Year A

	Terms 1 and 2		Terms 3 and 4	Terms 5 and 6	
Year ½ and Reception	Everyday Materials (Y1 and Y2)		Seasons (Y1)	Animals (Y1)	Plants (Y1 and Y2)
Year 3/4	Electricity (Y4)	Digestion and teeth (Y4)	States of Matter including the Water cycle (Y4)	Sound (Y4)	Living things and their habitats (Y4)
Year 5/6	Classification (Y6)	Electricity (Y6)	Circulation and The Heart (Y6)	Light (Y6)	Evolution and Inheritance (Y6)

Year B

	Terms 1 and 2		Terms 3 and 4	Terms 5 and 6	
Year ½ and Reception	Materials (Y1 and Y2)		Animals and Humans (Y2)	Plants (Y1 and Y2)	Habitats /food chains (Y2)
Year 3/4	Light and Shadows (Y3)	Animals- Skeletons (Y3)	Rocks and Soils (Y3)	Forces and Magnets (Y3)	Plants (Y3)
Year 5/6	Properties/changes in Materials (Y5)		Earth and Space (Y5)	Life Cycles (Y5)	Human Lifecycle (Y5)
					Forces (Y5)

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	EYFS	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
Plants	<p>Draw information from a simple map</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p> <p>Recognise some environments that are different to the one in which they live</p> <p>Understand the effect of changing seasons on the natural world around them</p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>Explore and describe 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</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p>Describe the life process of reproduction in some plants and animals</p> <p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>
Living things and their habitats	<p>Draw information from a simple map</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p> <p>Recognise some environments that are different to the one in which they live</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>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</p>	<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things</p>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p> <p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>
Animals including Humans	<p>Talk about members of their immediate family and community</p> <p>Name and describe people who are familiar to them</p> <p>Recognise some environments that are different to the one in which they live</p>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p> <p>Understand that animals, including humans, have offspring which grow into adults</p> <p>Describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>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</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p> <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>Describe the changes as humans develop to old age</p> <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p>
Evolution and inheritance				<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>
Materials	<p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p>	<p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p> <p>Compare and group materials together, according to whether they are solids, liquids or gases</p>	<p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p>

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		<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>Find out and describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>	<p>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</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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</p>
Light			<p>Recognise that we need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect eyes</p> <p>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 change</p>	<p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>
Forces			<p>Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others</p> <p>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</p> <p>Describe magnets as having two poles</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>
Sound			<p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	
Electricity			<p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>

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Earth and Space	Explore the natural world around them	Observe changes across the four seasons		Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
	Describe what they see, hear and feel whilst outside	Observe and describe weather associated with the seasons and how day length varies		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

Skills	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking Questions	Ask questions to find out more and to check they understand what has been said to them.	Start to ask and suggest answers to simple scientific questions	Ask and raise their own scientific questions	Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources	Generate and answer scientific questions using evidence	Use science experiences to plan different types of enquiry	Plan different types of scientific enquiry in order to answer questions
Making Predictions		Use first-hand practical experiences to find answers	Use first-hand practical experiences to find answers	Develop different types of scientific enquiry	Select most appropriate type of scientific enquiry		Use science experiences to explore ideas and raise different types of question
Setting up tests		Perform simple tests with support	Perform simple tests	Set up simple practical enquiries Understand comparative and fair tests	Suggest, set up and carry out simple practical enquires Understand comparative and fair tests	Recognise and control variables where necessary	Recognise and control variables where necessary Explain which variables need to be controlled and why
Observing and Measuring	Explore the natural world around them Describe what they see, hear and feel whilst outside Develop their small motor skills so that they can use a range of tools competently, safely and confidently	Start to observe closely Begin to use simple equipment eg egg timers, hand lenses	Observe closely Use simple equipment eg hand lenses, egg timers	Develop skills of systematic observation Use range of equipment to measure accurately eg data-loggers, thermometers	Make systematic observations Confidently use range of equipment to measure accurately eg data-loggers, thermometers	Independently decide which observations to make Take measurements using a range of scientific equipment with accuracy and precision	Independently decide which observations to make Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate
Recording Data	Count objects, actions and sounds Compare length, weight and capacity	Begin to gather and record data simply using pictures and words	Gather and record data using diagrams, words and charts	Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts	Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts	Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs	Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs
Interpreting and communicating results	Use talk to help work out problems and organise thinking and activities, and to explain how this work and why they might happen.	Start to discuss what they have found out	Discuss what they have found out	Report on findings orally and in writing using scientific language Use results to draw simple conclusions and make predictions	Report on findings orally and in writing using scientific language to answer questions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions	Report and present findings from enquiries, examining causal relationships and reliability of results Use test results to make predictions to set up further tests (comparative/fair)	Report and present findings from enquiries, examining causal relationships and reliability of results Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning
Evaluating				Identify similarities, differences, changes related to scientific processes and ideas	Explain similarities, differences, changes related to scientific processes and ideas	Identify scientific evidence that has been used to support/refute arguments	Interpret scientific evidence that has been used to support/refute arguments

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THEME	Enquiry Skills					Enquiry Types						Substantive Knowledge			
	Asking questions	Making predictions	Setting up tests	Observing & Measuring	Recording Data	Interpreting & communicating results	Evaluating	Comparative/fair test	Research	Observation over time	Pattern-seeking	Identifying, grouping, classifying	Problem Solving	5 Key facts	Substantive Concepts
1A Everyday Materials Knowledge Assessment Statements: Explore the natural world around them Describe what they see, hear and feel whilst outside 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 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 and describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	✓	✓	✓	✓	✓			✓				✓	<ul style="list-style-type: none"> All objects are made of one or more materials Some objects can be made from more than one material (e.g. spoons can be metal, wooden or plastic) Materials can be described by their properties (shiny, stretchy, rough) Some materials can be in different forms (e.g. plastic) Some materials behave differently in different forms (e.g. plastic). 	Materials can be changed Ole Kirk Christiansen Ole Kirk Christiansen invented Lego in 1949. Charles Macintosh Charles Macintosh invented the first waterproof fabric.	wood plastic metal glass rock material
2A Seasons Knowledge Assessment Statements: Explore the natural world around them Describe what they see, hear and feel whilst outside Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies		✓		✓	✓							✓	<ul style="list-style-type: none"> In the UK the day is longest in mid-summer and gets shorter until mid-winter before getting longer again The weather changes with the seasons There are four seasons (spring, summer, autumn, winter) In the UK it is usually colder and rainier in the winter but dryer and warmer in the summer The changes in the weather cause other changes (like some animals hibernating) 	The Earth rotates giving us day and night. The Earth orbits the sun giving us seasons. George James Symons George James Symons invented his own version of the rain gauge that is still used by meteorologists today. James Blyth James Blyth invented the wind turbine in 1887. He used it to power the lights in his holiday home. Mae Jemison	weather seasons spring summer autumn winter

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				<p>In 1992, Mae Jemison became the first African American woman in space. She was a scientist.</p>																	
<p>3A</p>	<p>Animals and Humans Knowledge Assessment Statements:</p> <p>Talk about members of their immediate family and community</p> <p>Name and describe people who are familiar to them</p> <p>Recognise some environments that are different to the one in which they live</p> <p>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</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p> <p>Understand that animals, including humans, have offspring which grow into adults Describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<table border="1"> <tr> <td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td><td>✓</td><td>✓</td><td></td> </tr> </table> <p>Ask questions to find out more and to check they understand what has been said to them. Start to ask and suggest answers to simple scientific questions Ask and raise their own scientific questions</p> <p>Use first-hand practical experiences to find answers Use first-hand practical experiences to find answers</p> <p>Perform simple tests with support Perform simple tests Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside Start to observe closely Observe closely</p> <p>Develop their small motor skills so that they can use a range of tools competently, safely and confidently Begin to use simple equipment eg egg timers, hand lenses Use simple equipment eg hand lenses, egg timers</p> <p>Count objects, actions and sounds Compare length, weight and capacity Begin to gather and record data simply using pictures and words Gather and record data using diagrams, words and charts</p> <p>Use talk to help work out problems and organise thinking and activities, and to explain how this work and why they might happen. Start to discuss what they have found out Discuss what they have found out</p>	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		<ul style="list-style-type: none"> Animals have different body parts (wings, tails, beaks, legs) and different body coverings (feathers, fur, skin, scales) The key features help us to identify animals Animals eat specific things. Some only eat plants, some only eat other animals and some eat both. Humans have key parts in common but they vary from person to person Humans have five senses (sight, hearing, touch, taste, smelling) 	<table border="1"> <tr> <td data-bbox="1667 280 1887 451"> Living things can be grouped by their common characteristics </td> <td data-bbox="1887 280 2062 451"> head body sense scales claw paws </td> </tr> <tr> <td colspan="2" data-bbox="1667 451 2062 1024"> <p>Linda Brown Buck Linda Brown Buck is an American biologist. She discovered that mammals have odorant receptors in their noses. This means they can smell over 10,000 different smells. She won the Nobel Prize in 2004</p> <p>George Mottershead George Mottershead founded Chester zoo in 1931. This zoo was unusual at the time as the animals did not live in cages. They lived in larger enclosures.</p> </td> </tr> </table>	Living things can be grouped by their common characteristics	head body sense scales claw paws	<p>Linda Brown Buck Linda Brown Buck is an American biologist. She discovered that mammals have odorant receptors in their noses. This means they can smell over 10,000 different smells. She won the Nobel Prize in 2004</p> <p>George Mottershead George Mottershead founded Chester zoo in 1931. This zoo was unusual at the time as the animals did not live in cages. They lived in larger enclosures.</p>	
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<p>4A</p>	<p>Plants Knowledge Assessment Statements:</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p> <p>Recognise some environments that are different to the one in which they live</p> <p>Understand the effect of changing seasons on the natural world around them</p> <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Observe and describe how seeds and bulbs grow into mature plants</p>	<table border="1"> <tr> <td></td><td></td><td></td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td></td><td>✓</td> </tr> </table> <p>Describe what they see, hear and feel whilst outside Start to observe closely Observe closely</p> <p>Use talk to help work out problems and organise thinking and activities, and to explain how this work and why they might happen. Start to discuss what they have found out Discuss what they have found out</p>				✓							✓		✓	<ul style="list-style-type: none"> There are lots of different plants that grow near school Some of the trees near school include horse chestnuts, oaks and poplar trees Different trees have different shaped leaves Some trees lose their leaves in autumn and some do not Flowers on trees are called blossom 	<table border="1"> <tr> <td data-bbox="1667 1024 1887 1190"> Living things can be grouped by their common characteristics </td> <td data-bbox="1887 1024 2062 1190"> leaf flower root seed fruit stem </td> </tr> <tr> <td colspan="2" data-bbox="1667 1190 2062 1433"> <p>Tim Smit Tim Smit had the idea to build the Eden Project.</p> <p>Nicholas Grimshaw Nicholas Grimshaw designed the biomes for the Eden Project.</p> </td> </tr> </table>	Living things can be grouped by their common characteristics	leaf flower root seed fruit stem	<p>Tim Smit Tim Smit had the idea to build the Eden Project.</p> <p>Nicholas Grimshaw Nicholas Grimshaw designed the biomes for the Eden Project.</p>	
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	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy			
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	THEME	Enquiry Skills							Enquiry Types						Substantive Knowledge		
		Asking questions	Making predictions	Setting up tests	Observing & Measuring	Recording Data	Interpreting & communicating results	Evaluating	Comparative/fair test	Research	Observation over time	Pattern-seeking	Identifying, grouping, classifying	Problem Solving	5 Key facts	Substantive Concepts	Vocabulary
1B	Materials Knowledge Assessment Statements: Explore the natural world around them Describe what they see, hear and feel whilst outside 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 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 and describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	✓	✓	✓	✓	✓	✓		✓	✓				✓	<ul style="list-style-type: none"> All objects are made of one or more materials and that are chosen because they have suitable properties for the task. When choosing what to make an object from the properties of different materials need to be compared A material can be suitable for different purposes Some materials can be changed easily by bending, twisting, squashing or stretching Some materials cannot be changed easily such as rock 	Non-living things can be grouped by their common characteristics Ole Kirk Christiansen Ole Kirk Christiansen invented Lego in 1949. Charles Macintosh Charles Macintosh invented the first waterproof fabric.	properties suitable flexible opaque transparent reflective
2B	Animals including humans Knowledge Assessment Statements: Talk about members of their immediate family and community Name and describe people who are familiar to them Recognise some environments that are different to the one in which they live				✓	✓	✓			✓			✓	<ul style="list-style-type: none"> Animals, including humans, have offspring which grow into adults In humans and some animals these offspring are young which will grow into adults 	Living things reproduce Living things need to feed, drink and respire	offspring reproduction young disease infection survive	

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	<p>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</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p> <p>Understand that animals, including humans, have offspring which grow into adults</p> <p>Describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>Begin to gather and record data simply using pictures and words Gather and record data using diagrams, words and charts</p> <p>Use talk to help work out problems and organise thinking and activities, and to explain how this work and why they might happen. Start to discuss what they have found out Discuss what they have found out</p>	<ul style="list-style-type: none"> • In other animals they may lay eggs that hatch and grow in stages • All animals, including humans, have a basic need to feed, drink and breathe in order to survive • Good hygiene is important to prevent illness and infection 	<p>Louis Pasteur Louis Pasteur discovered that germs are living things that can be spread by touch or through the air.</p> <p>Elizabeth Garrett Anderson Elizabeth was the first woman to qualify as a doctor. She qualified in 1865.</p>	
<p>3B</p>	<p>Plants Knowledge Assessment Statements: Draw information from a simple map</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p> <p>Recognise some environments that are different to the one in which they live</p> <p>Understand the effect of changing seasons on the natural world around them</p> <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>✓ ✓ ✓ ✓ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ✓ <input type="checkbox"/> <input type="checkbox"/> ✓ <input type="checkbox"/> <input type="checkbox"/> ✓</p> <p>Ask questions to find out more and to check they understand what has been said to them. Start to ask and suggest answers to simple scientific questions Ask and raise their own scientific questions</p> <p>Use first-hand practical experiences to find answers Use first-hand practical experiences to find answers</p> <p>Perform simple tests with support Perform simple tests Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside Start to observe closely Observe closely</p>	<ul style="list-style-type: none"> • Plants may grow from seeds or bulbs • After plants germinate, they develop into seedlings and then into mature plants • Different plants grow best in different conditions • All plants need some water and space to grow well, but the amount varies • Some plants grow best in lots of sunlight while others need shade 	<p>Living things reproduce Living things need to feed, drink and respire</p>	<p>light shade healthy bulb germinate seedling</p>
<p>4B</p>	<p>Habitats /food chains Knowledge Assessment Statements: Draw information from a simple map</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside</p>	<p>✓ ✓ ✓ ✓ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ✓ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ✓</p> <p>Ask questions to find out more and to check they understand what has been said to them. Start to ask and suggest answers to simple scientific questions Ask and raise their own scientific questions</p> <p>Use first-hand practical experiences to find answers</p>	<ul style="list-style-type: none"> • All objects are either living or dead or have never been alive • An object made of rock, metal or plastic has never been alive 	<p>Ecosystems are sensitive to change</p>	<p>habitat dead alive never living suited food chain</p>

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<p>Recognise some environments that are different to the one in which they live</p> <p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>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</p>	<p>Use first-hand practical experiences to find answers</p> <p>Perform simple tests with support Perform simple tests Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside Start to observe closely Observe closely</p> <p>Develop their small motor skills so that they can use a range of tools competently, safely and confidently Begin to use simple equipment eg egg timers, hand lenses Use simple equipment eg hand lenses, egg timers</p>	<ul style="list-style-type: none"> • Animals and plants live in environments and habitats that meet their needs • All animals need water, food and shelter • We can show how animals and plants in a habitat are connected through food chains 	<p>Rachel Carson Rachel Carson was a scientist who studied ocean habitats. She discovered that pollution from farms was affecting the oceans and the animals in them.</p>
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THEME	Enquiry Skills							Enquiry Types					Substantive Knowledge				
	Asking questions	Making predictions	Setting up tests	Recording & Measuring	Recording Data	Interpreting & communicating results	Evaluating	Comparative/fair test	Research	Observation over time	Pattern-seeking	Identifying, grouping, classifying	Problem Solving	5 Key Facts	Substantive Concepts	Vocabulary	
5 A	Electricity Knowledge Assessment Statements: 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 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							Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence Develop different types of scientific enquiry Select most appropriate type of scientific enquiry Set up simple practical enquiries Suggest, set up and carry out simple practical enquires Understand comparative and fair tests Understand comparative and fair tests Develop skills of systematic observation Make systematic observations Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions Use results to draw simple conclusions and make predictions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions Identify similarities, differences, changes related to scientific processes and ideas Explain similarities, differences, changes related to scientific processes and ideas					<ul style="list-style-type: none"> • Many household devices run on electricity; some plug in at the mains and others run on batteries. • An electrical circuit consists of a cell or battery connected to components by wires • If there is a break in the circuit or a loose connection or a short circuit the component will not work • A switch can be added to a circuit to turn a component on or off • Metals are good conductors but most non-metallic solids are insulators 			Electricity will only flow in a complete circuit Thomas Edison (1847-1931) Thomas Edison was an American inventor. He is sometimes described as America's greatest inventor. He invented the first practical incandescent light bulb	conductor insulator appliance component circuit connection
6 A	Sound							✓	✓	✓	✓	✓	✓	✓			pitch

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	<p>Knowledge Assessment Statements: Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p>Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence</p> <p>Develop different types of scientific enquiry Select most appropriate type of scientific enquiry</p> <p>Set up simple practical enquiries Suggest, set up and carry out simple practical enquires</p> <p>Understand comparative and fair tests Understand comparative and fair tests</p> <p>Develop skills of systematic observation Make systematic observations</p> <p>Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers</p> <p>Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts</p> <p>Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions</p> <p>Use results to draw simple conclusions and make predictions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions</p> <p>Identify similarities, differences, changes related to scientific processes and ideas Explain similarities, differences, changes related to scientific processes and ideas</p>	<ul style="list-style-type: none"> • A sound produces vibrations which travel through a medium from source to our ears. • Different mediums, such as solids, liquids and gases, can carry sound but sound cannot travel through a vacuum. • Vibrations cause little bones inside our ears to vibrate allowing us to hear the sound. • The volume of a sound depends on the strength of vibrations which decreases as they travel. • Pitch is the highness/lowness of a sound and is affected by the features of the objects producing the sound; usually, smaller objects produce higher pitched sounds. 	<p>Sound travels in waves. Different sounds have different waves.</p>	<p>volume insulator vibration faint medium</p>
7 A	<p>States of Matter including the Water cycle</p> <p>Knowledge Assessment Statements: Compare and group materials together, according to whether they are solids, liquids or gases</p>	<p>Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence</p>	<ul style="list-style-type: none"> • A solid keeps its shape and has a fixed volume; a liquid has a fixed volume but not a fixed shape; a gas fills all of the available space 	<p>Materials can be changed</p>	<p>precipitation condensation evaporation temperature melting freezing</p>

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	<p>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</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p>Develop different types of scientific enquiry Select most appropriate type of scientific enquiry</p> <p>Set up simple practical enquiries Suggest, set up and carry out simple practical enquires</p> <p>Understand comparative and fair tests Understand comparative and fair tests</p> <p>Develop skills of systematic observation Make systematic observations</p> <p>Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers</p> <p>Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts</p> <p>Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions</p>	<ul style="list-style-type: none"> • Food contains different nutrients and many foods have a mix of nutrients in them • You need a balance of nutrients to keep your body healthy • Humans and other animals have skeletons which support and protect their bodies • Humans and other animals have muscles which help them to move 	<p>skull</p> <p>Wilhelm Conrad Rontgen (1845-1923) Wilhelm Rontgen was a German physicist who discovered X-rays in 1895. He was awarded many honours and won the Nobel Prize for physics.</p>
<p>7 B</p>	<p>Rocks and Soils Knowledge Assessment Statements:</p> <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence</p> <p>Develop different types of scientific enquiry Select most appropriate type of scientific enquiry</p> <p>Set up simple practical enquiries Suggest, set up and carry out simple practical enquires</p> <p>Understand comparative and fair tests Understand comparative and fair tests</p> <p>Develop skills of systematic observation Make systematic observations</p> <p>Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers</p> <p>Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts</p> <p>Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions</p>	<ul style="list-style-type: none"> • Rock is a naturally occurring material • There are different types of rock which have different properties • Some rocks absorb water • Soils are made up from pieces of ground down rock mixed with plant and animal materials • Some rocks contain fossils which were formed millions of years ago from dead plants and animals. 	<p>Materials can be changed</p> <p>absorb fossil minerals boulder pebble stone</p> <p>Mary Anning (1799-1847) Mary Anning was an English palaeontologist and fossil collector. She became known around the world for important finds she made in Jurassic fossil beds in Dorset.</p> <p>Holly Betts PhD student, University of Bristol Holly is a palaeobiologist. She is researching whether fossils are best for establishing a timescale for recent and ancient episodes in our evolutionary history.</p>

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		<p>Use results to draw simple conclusions and make predictions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions</p> <p>Identify similarities, differences, changes related to scientific processes and ideas Explain similarities, differences, changes related to scientific processes and ideas</p>	
8 B	<p>Light and Shadows</p> <p>Recognise that we need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect eyes</p> <p>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 change</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence</p> <p>Develop different types of scientific enquiry Select most appropriate type of scientific enquiry</p> <p>Set up simple practical enquiries Suggest, set up and carry out simple practical enquires</p> <p>Understand comparative and fair tests Understand comparative and fair tests</p> <p>Develop skills of systematic observation Make systematic observations</p> <p>Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers</p> <p>Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts</p> <p>Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions</p> <p>Use results to draw simple conclusions and make predictions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions</p> <p>Identify similarities, differences, changes related to scientific processes and ideas Explain similarities, differences, changes related to scientific processes and ideas</p>	<ul style="list-style-type: none"> • We see things because our eyes can sense light • Dark is the absence of light and we cannot see in complete darkness • Some surfaces reflect light and these are easier to see when there is less light • Shadows are formed on a surface when an opaque or translucent object is between the light source and the surface because it blocks some of the light • The light from the sun can damage our eyes if we look at it directly.
			<p>Visible light cannot pass through opaque objects.</p> <p>light source sunlight dangerous opaque reflective</p>
			<p>Justus von Liebig (1803-1873) Justus von Liebig was a German chemist. In 1835 he developed a process for applying a thin layer of metallic silver to one side of a pane of clear glass. This technique was soon adapted and improved, allowing for the mass production of mirrors.</p>
9 B	<p>Plants</p> <p>Knowledge Assessment Statements:</p> <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Ask relevant scientific questions and suggest how to answer eg practical test vs secondary sources Generate and answer scientific questions using evidence</p> <p>Develop different types of scientific enquiry Select most appropriate type of scientific enquiry</p>	<ul style="list-style-type: none"> • Many plants, though not all, have roots, stems/trunks, leaves and flowers/blossom. • The roots absorb water and nutrients from the soil and anchor the plant in place.
			<p>Living things reproduce</p> <p>Living things need to feed, drink and respire</p> <p>reproduce pollen dispersal transport pollination function</p>

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<p>Explore and describe 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</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p>Set up simple practical enquiries Suggest, set up and carry out simple practical enquiries</p> <p>Understand comparative and fair tests Understand comparative and fair tests</p> <p>Develop skills of systematic observation Make systematic observations</p> <p>Use range of equipment to measure accurately eg data-loggers, thermometers Confidently use range of equipment to measure accurately eg data-loggers, thermometers</p> <p>Gather, record and present data in variety of ways eg drawings, labelled diagrams, charts Gather, record, classify and present data in a wide variety of ways eg drawings, labelled diagrams, charts</p> <p>Report on findings orally and in writing using scientific language Report on findings orally and in writing using scientific language to answer questions</p> <p>Use results to draw simple conclusions and make predictions Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions</p> <p>Identify similarities, differences, changes related to scientific processes and ideas Explain similarities, differences, changes related to scientific processes and ideas</p>	<ul style="list-style-type: none"> • The stem transports water and nutrients around the plant and holds the leaves and flower up. • The leaves use sunlight and water to produce the plant's food • Some plant have flowers which enable the plant to reproduce. 	<p>Professor Monique Simmonds Monique Simmonds is the deputy director of science at the Royal Botanic Gardens, Kew. She researches traditional and commercial uses of plants and fungi. Her work involves her promoting plant and fungal based solutions to global challenges.</p> <p>Joseph Dalton Hooker (1817-1911) Joseph Hooker was a doctor and travelled to many places. He was a plant collector and botanist and brought many plants back to the UK. Joseph was interested in finding out why plants grow in the locations they do.</p>
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	THEME	Enquiry Skills							Enquiry Types					Substantive Knowledge			
		Asking questions	Making predictions	Setting up tests	Observing & Measuring	Recording Data	Interpreting & communicating results	Evaluating	Comparative/fair test	Research	Observation over time	Pattern-seeking	Identifying, grouping, classifying	Problem Solving	Topic Knowledge (5KFs)	Substantive Concepts	Vocabulary
10 A	<p>Classification</p> <p>Knowledge Assessment Statements:</p> <p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓		<ul style="list-style-type: none"> Living things can be formally grouped according to their characteristics Plants and animals are two main groups but there are other things, like micro-organisms, that do not fit these categories Plants make their own food whereas animals cannot Animals can be separated into two main groups; vertebrates (with a back bone) and invertebrates (without a back bone). These groups can be subdivided further Plants belong to two main groups; flowering and non-flowering 	<p>Living things can be grouped by their common characteristics</p> <p>Ecosystems are sensitive to change</p> <p>Carl Linnaeus (1707-1778) Carl Linnaeus was a Swedish scientist who developed the modern system of classifying and naming organisms. Before this the names of living things were often very long. He gave them a two-part name.</p> <p>Chris Nelson Chris Nelson is a horticulturist and a director of Growing Underground which uses hydroponic techniques to grow pesticide-free crops in a former London underground air-raid shelter.</p>	<p>vertebrate</p> <p>invertebrate</p> <p>classification</p> <p>characteristics</p> <p>micro-organism</p> <p>bacteria</p>
11 A	Light	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓				transparent

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	<p>Knowledge Assessment Statements:</p> <p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	<p>Use science experiences to plan different types of enquiry Use science experiences to explore ideas and raise different types of question Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary Recognise and control variables where necessary Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair) Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments Interpret scientific evidence that has been used to support/refute arguments</p>	<ul style="list-style-type: none"> Light appears to travel in straight lines and we see objects when the light from them goes into our eyes The light may come directly from light sources, but for other objects come light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows Because light travels in straight lines the shape for the shadow will be the same shape as the outline shape of the object Translucent objects cast lighter shadows than opaque ones 	<p>Visible light cannot pass through opaque objects.</p>	<p>translucent opaque reflection light rays straight lines</p>
12 A	<p>Evolution and Inheritance</p> <p>Knowledge Assessment Statements:</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Use science experiences to plan different types of enquiry Use science experiences to explore ideas and raise different types of question Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary Recognise and control variables where necessary Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs</p>	<ul style="list-style-type: none"> All living things have offspring of the same kind as features of the offspring are inherited from their parents; due to sexual reproduction different characteristics are inherited so offspring are not identical to their parents Plants and animals have characteristics which make them suited (adapted) to their environment 	<p>Ecosystems are sensitive to change</p> <p>Living things reproduce</p>	<p>inherited evolution theory adaptation survival natural selection</p>
	<p>Charles Darwin (1809-1882) Charles Robert Darwin was born in Shrewsbury and was an English naturalist and biologist. His scientific theory of evolution by natural selection became the foundation of modern evolutionary studies.</p> <p>Alfred Wallace (1823-1913)</p>				

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		Interpret scientific evidence that has been used to support/refute arguments						
14 A	<p>Electricity</p> <p>Knowledge Assessment Statements:</p> <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Use science experiences to plan different types of enquiry Use science experiences to explore ideas and raise different types of question Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary Recognise and control variables where necessary Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair) Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments Interpret scientific evidence that has been used to support/refute arguments</p>	<ul style="list-style-type: none"> • Adding more cells to a complete circuit will make a bulb brighter/a buzzer louder/ a motor spin faster • Adding more bulbs to a circuit will make each bulb less bright • If the voltage of the battery is too low the bulb may not light; if it is too high the bulb may break • A switch completes or breaks an electrical circuit • There are recognised symbols to represent different components in an electrical circuit 	<table border="1"> <tr> <td data-bbox="1587 358 1793 532">Electricity will only flow in a complete circuit</td> <td data-bbox="1793 358 2009 532">circuit voltage diagram symbol battery complete</td> </tr> <tr> <td colspan="2" data-bbox="1587 532 2009 1209"> <p>Nicholas Tesla (1856-1943) Nicholas Tesla was a Serbian/American engineer and physicist. He invented the first alternating current (AC) motor and developed AC generation and transmission technology. He worked for Thomas Edison when he first moved to New York.</p> <p>Peter Rawlinson Peter Rawlinson is a British engineer based in California. He is working on the development of electric vehicles, providing clear vision for a next generation product.</p> </td> </tr> </table>	Electricity will only flow in a complete circuit	circuit voltage diagram symbol battery complete	<p>Nicholas Tesla (1856-1943) Nicholas Tesla was a Serbian/American engineer and physicist. He invented the first alternating current (AC) motor and developed AC generation and transmission technology. He worked for Thomas Edison when he first moved to New York.</p> <p>Peter Rawlinson Peter Rawlinson is a British engineer based in California. He is working on the development of electric vehicles, providing clear vision for a next generation product.</p>	
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<p>Nicholas Tesla (1856-1943) Nicholas Tesla was a Serbian/American engineer and physicist. He invented the first alternating current (AC) motor and developed AC generation and transmission technology. He worked for Thomas Edison when he first moved to New York.</p> <p>Peter Rawlinson Peter Rawlinson is a British engineer based in California. He is working on the development of electric vehicles, providing clear vision for a next generation product.</p>								

Theme		Enquiry Skills							Enquiry Types					Substantive Knowledge		
		Asking questions	Making predictions	Setting up tests	Observing & Measuring	Recording Data	Interpreting & communicating results	Evaluating	Comparative/fair test	Research	Observation over time	Pattern-seeking	Identifying, grouping, classifying	Problem Solving	Topic Knowledge (5KFs)	Substantive Concepts
10 B	<p>Properties/changes in Materials</p> <p>Knowledge Assessment Statements:</p> <p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> Materials have different uses depending on their properties and state (solid, liquid, gas) Properties include hardness, porosity, transparency, electrical and thermal conductivity, and attraction to magnets Some materials dissolve in a liquid to form a solution while others are insoluble and form sediment Mixtures can be separated by filtering, evaporation or sieving Some changes to materials, like dissolving, mixing and changes of state are reversible but others are not 	<p>Materials can be changed</p> <p>Joe Keddie Joe Keddie is a professor of Soft Matter Physics at the University of Surrey. He is interested in the fundamental processes of soft matter, especially polymer thin films and nanoparticles</p> <p>Spencer Silver (born 1941) Spencer Silver is an American scientist who together with Arthur Fry was the inventor of Post-it notes in 1974. At the time, he was working to develop new classes of adhesives.</p>	<p>dissolve</p> <p>solution</p> <p>sediment</p> <p>reversible</p> <p>irreversible</p> <p>insoluble</p>
11 B	Forces	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓			resistance

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	<p>Knowledge Assessment Statements:</p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>	<p>Use science experiences to plan different types of enquiry Use science experiences to explore ideas and raise different types of question Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary Recognise and control variables where necessary Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair) Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments Interpret scientific evidence that has been used to support/refute arguments</p>	<ul style="list-style-type: none"> A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to Earth by gravity Air resistance, water resistance and friction are contact forces which act between moving surfaces. A mechanism is a device that allows a small force to be increased to a larger force 	<p>Forces push or pull</p> <p>pulley lever gear friction gravity</p>	<p>Galileo Galilei (1564-1642) He was an Italian scientist. He discovered that if two objects of similar shape and size are dropped, they will fall at the same rate.</p> <p>Sir Isaac Newton (1642-1726) He was an English scientist and mathematician. He 'discovered' the concept of gravity when sitting under a tree and an apple fell to the ground near him.</p> <p>Emma England - Aeronautical engineer Emma works as part of a team designing the wings of aircrafts.</p>
12 B	<p>Earth and Space</p> <p>Knowledge Assessment Statements:</p> <p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Use science experiences to plan different types of enquiry Use science experiences to explore ideas and raise different types of question Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary Recognise and control variables where necessary Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision</p>	<ul style="list-style-type: none"> The sun is a star at the centre of our solar system There are 8 planets which travel around the sun in fixed orbits Earth takes 365.25 days to complete its orbit around the sun The Earth rotates on its axis once every 24 hours and the Sun appears to move across the sky 	<p>The Earth rotates giving us day and night. The Earth orbits the sun giving us seasons.</p>	<p>spherical solar planet orbit rotate axis</p> <p>Nicolaus Copernicus (1473-1543) Nicolaus was a Polish astronomer and mathematician who formulated the heliocentric model of the solar system that placed the Sun rather than the Earth at the centre of the universe.</p>

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	<p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>	<p>Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs</p> <p>Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair)</p> <p>Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments</p> <p>Interpret scientific evidence that has been used to support/refute arguments</p>	<ul style="list-style-type: none"> The moon orbits the Earth and takes 28 days to complete its orbit; we see it because it reflects the Sun's light 	<p>Maggie Aderin-Pocock (born 1968)</p> <p>Maggie is a British space scientist and science educator. She is working on the observation instruments for the Aeolus satellite, which will measure wind speeds to help the investigation of climate change.</p>				
13 B	<p>Life Cycles</p> <p>Knowledge Assessment Statements:</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p>	<p>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</p> <p>Use science experiences to plan different types of enquiry</p> <p>Use science experiences to explore ideas and raise different types of question</p> <p>Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary</p> <p>Recognise and control variables where necessary</p> <p>Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make</p> <p>Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision</p> <p>Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs</p> <p>Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair)</p>	<ul style="list-style-type: none"> As part of their lifecycle, plants and animals reproduce. Most animals reproduce sexually, this involves two parents where the sperm from the male fertilises the female egg Animals, including humans, have offspring which grow into adults Plants reproduce both sexually and asexually; sexual reproduction takes place through pollination Gardeners can force plants to reproduce asexually by taking cuttings 	<table border="1"> <tr> <td data-bbox="1604 721 1780 961">Ecosystems are sensitive to change</td> <td data-bbox="1780 721 1957 961">life-cycle sexual fertilises offspring parent</td> </tr> <tr> <td colspan="2" data-bbox="1604 961 1957 1443"> <p>David Attenborough (born 1926)</p> <p>Sir David is an English broadcaster and naturalist. He has made many famous wildlife programmes. He was knighted in 1985.</p> <p>Lucy Evelyn Cheesman (1881-1969)</p> <p>Lucy Cheesman was a British entomologist (someone who studies insects) and traveller. She collected over 70,000 specimens of insects, plants and other animals.</p> <p>Sarah Fowler Sarah Fowler (OBE) is a marine biologist. She is the principal scientist of the Save Our Seas Foundation. Her research</p> </td> </tr> </table>	Ecosystems are sensitive to change	life-cycle sexual fertilises offspring parent	<p>David Attenborough (born 1926)</p> <p>Sir David is an English broadcaster and naturalist. He has made many famous wildlife programmes. He was knighted in 1985.</p> <p>Lucy Evelyn Cheesman (1881-1969)</p> <p>Lucy Cheesman was a British entomologist (someone who studies insects) and traveller. She collected over 70,000 specimens of insects, plants and other animals.</p> <p>Sarah Fowler Sarah Fowler (OBE) is a marine biologist. She is the principal scientist of the Save Our Seas Foundation. Her research</p>	
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		<p>Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments</p> <p>Interpret scientific evidence that has been used to support/refute arguments</p>		<p>has identified the global threat to sharks and she shares strategies of how we can protect them.</p>																				
14 B	<p>Human Lifecycle</p> <p>Knowledge Assessment Statements: Describe the changes as humans develop to old age</p>	<table border="1" data-bbox="548 363 1068 410"> <tr> <td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> <p>Use science experiences to plan different types of enquiry</p> <p>Use science experiences to explore ideas and raise different types of question</p> <p>Plan different types of scientific enquiry in order to answer questions</p> <p>Recognise and control variables where necessary</p> <p>Recognise and control variables where necessary</p> <p>Explain which variables need to be controlled and why</p> <p>Independently decide which observations to make</p> <p>Independently decide which observations to make</p> <p>Take measurements using a range of scientific equipment with accuracy and precision</p> <p>Take measurements using a range of scientific equipment with accuracy and precision, taking repeat readings where appropriate</p> <p>Record data/results of increasing complexity using diagrams, classification keys, tables, bar and line graphs</p> <p>Decide how to record data/results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Report and present findings from enquiries, examining causal relationships and reliability of results</p> <p>Use test results to make predictions to set up further tests (comparative/fair)</p> <p>Use test results to make predictions to set up further tests (comparative/fair) and explain reasoning</p> <p>Identify scientific evidence that has been used to support/refute arguments</p> <p>Interpret scientific evidence that has been used to support/refute arguments</p>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							<ul style="list-style-type: none"> • When babies are young they grow rapidly • Babies are very dependent on their parents • As humans grow and develop they grow they learn many skills • At puberty a child's body changes and develops the primary and secondary sexual characteristics • This enables the adult to reproduce 	<table border="1" data-bbox="1614 363 1953 1239"> <tr> <td data-bbox="1614 363 1780 496"> <p>Living things need to feed, drink and respire</p> </td> <td data-bbox="1780 363 1953 496"> <p>puberty adolescent</p> </td> </tr> <tr> <td data-bbox="1614 496 1780 553"> <p>Living things reproduce</p> </td> <td data-bbox="1780 496 1953 553"> <p>infant dependant reproduce</p> </td> </tr> </table>	<p>Living things need to feed, drink and respire</p>	<p>puberty adolescent</p>	<p>Living things reproduce</p>	<p>infant dependant reproduce</p>
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