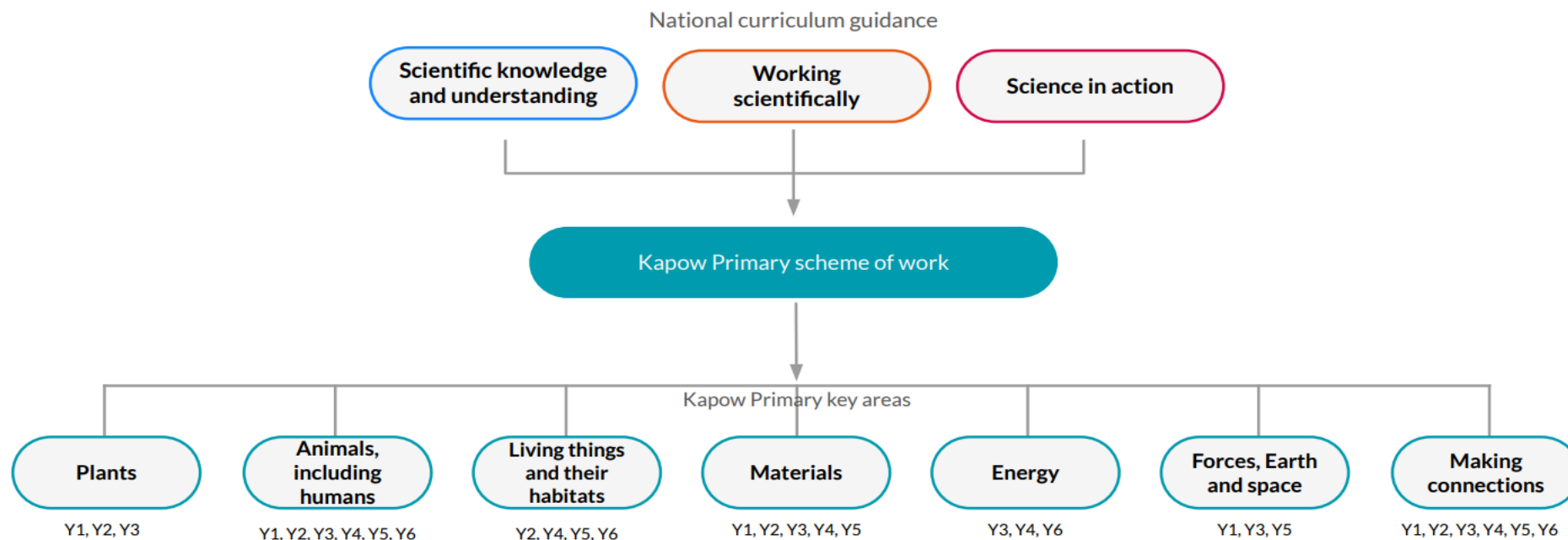


Science Knowledge and Skills Progression



Science Knowledge and Skills Progression				
Scientific Knowledge and Understanding				
	Year 3	Year 4	Year 5	Year 6
Autumn 1	<p><u>Movement and Nutrition</u></p> <ul style="list-style-type: none"> Recall the three key functions of the skeleton (movement, support and protection). Describe a vertebrate, invertebrate, endoskeleton and 	<p><u>Digestions and Food</u></p> <ul style="list-style-type: none"> Label key organs found in the digestive system and describe each of their functions. Describe the functions of the four different types of adult, human teeth, using key vocabulary. 	<p><u>Mixtures and Separation</u></p> <ul style="list-style-type: none"> Define the term 'mixture' and name some common examples. Define the term 'sieving' and explain how sieving separates mixtures. 	<p><u>Classifying Big and Small</u></p> <ul style="list-style-type: none"> Define the term 'organism' and name the seven life processes of all living things. Describe the work of Carl Linnaeus. Define the term 'vertebrate' and name the vertebrate groups.

Science Knowledge and Skills Progression

	<p>exoskeleton and use this information to group animals.</p> <ul style="list-style-type: none"> ● Identify and name the skull, spine, ribs and pelvis on a diagram. ● Recall that muscles cause movements in the body, some of which we can control consciously. ● Describe that muscles can cause a movement by shortening and pulling on a bone. ● Recall that animals, including humans, need to eat food to survive. ● Describe some examples of how energy is used by the body and make comparisons about the energy demands between people. ● List some of the seven nutrient groups. ● Name foods that are good sources of nutrient groups and describe what they are needed for in the body. 	<ul style="list-style-type: none"> ● Know that good dental care involves brushing their teeth twice a day with toothpaste and a soft toothbrush. ● Produce a food chain that begins with a plant and has arrows that move up the food chain. ● Define a producer, predator and prey and identify examples in food chains. ● Describe digestion, teeth and diets when talking about the observed poo clues. ● Write a letter that uses a range of scientific vocabulary from the unit. 	<ul style="list-style-type: none"> ● Define the term 'filtering' and explain how filtering separates mixtures. ● Define the terms 'solution' and 'dissolve' and name some common examples of solutions. ● Recall some factors that affect the time taken to dissolve. ● Describe the effect of temperature on the time taken to dissolve. ● Define the term 'evaporating' and explain how evaporating separates solutions. ● Identify when sieving, filtering and evaporating should be used. 	<ul style="list-style-type: none"> ● Describe the characteristics of fish, amphibians, reptiles, birds and mammals. ● Compare the characteristics of the vertebrate groups. ● Define the term 'invertebrate'. ● Describe the characteristics of worms, snails, spiders and insects. ● Compare the characteristics of the invertebrate groups. ● Name the plant groups. ● Describe the characteristics of flowering plants, ferns, mosses and conifers. ● Define the term 'micro-organism' and name some examples.
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Science Knowledge and Skills Progression

	<ul style="list-style-type: none"> Compare two different meals and explain which is more balanced by naming the nutrient groups and commenting on the relevant proportions. 			
Autumn 2	<p><u>Forces and Magnets</u></p> <ul style="list-style-type: none"> Identify examples of pushes, pulls and twists. Define a force including describing, naming and classifying contact and non-contact forces. Describe the relationship between friction and the roughness of a surface. Identify examples of friction being useful or not. Predict attraction and repulsion between like and opposite poles. Identify examples of magnetic and non-magnetic materials. Name some examples of types of magnets 	<p><u>Electricity and Circuits</u></p> <ul style="list-style-type: none"> Recall a range of electrical appliances and classify them as mains or battery-powered. Explain why something is either mains or battery-powered. Explain how to test if a circuit works and identify when simple electric circuits will work. Identify symbols for open and closed switches. Predict whether a circuit will work based on whether the switch is open or closed and explain that it works by breaking and completing a circuit. Give examples of how switches are useful. Describe that a material is a good electrical conductor when it is 	<p><u>Properties and Changes</u></p> <ul style="list-style-type: none"> Determine the hardness of different materials and link this to their uses. Determine the transparency of different materials and link this to their uses. Determine the thermal and electrical conductivity of different materials and link this to their uses. Demonstrate, identify and describe reversible and irreversible changes. 	<p><u>Light and Reflection</u></p> <ul style="list-style-type: none"> Compare sources of light and explain how the eye is protected from light. Describe how light travels and how we see luminous and non-luminous objects. Recall factors that affect the size of a shadow and describe how the distance between an object and the surface its shadow is cast on affects the size of the shadow. Use ray diagrams to explain why shadows change size and why the shape of a shadow matches the object that cast it. Recall what happens to light when it reaches a smooth mirror surface. Identify the incoming and reflected rays and describe the relationship between their angles.



Science Knowledge and Skills Progression

	<p>and compare their strengths.</p> <ul style="list-style-type: none"> Describe some examples of the uses of magnets. 	<p>added to an electric circuit and the bulb lights.</p> <ul style="list-style-type: none"> Describe that a material is a good electrical insulator when it is added to an electric circuit and the bulb does not light. Recall that metals, for example, are good electrical conductors and plastics, for example, are good electrical insulators. Describe that the more bulbs added to a series circuit, the dimmer the bulbs will be. Explain that the bulbs will be dimmer when more are added to a circuit, as less energy is transferred to each of them. Describe precautions for working safely with electricity. Explain some precautions using knowledge of circuit diagrams, electrical components, conductors or insulators. 		<ul style="list-style-type: none"> Use mirrors to make a working periscope and explain how a periscope works using ray diagrams. Recall a range of uses of mirrors and reflection and describe how a mirror reflects light in different situations. Explain how light is reflected using knowledge of light and reflection.
Spring 1	<p><u>Rocks and Soil</u></p> <ul style="list-style-type: none"> Define the term 'rock'. Describe the appearance of different rocks; identifying both crystals and grains. 	<p><u>States of Matter</u></p> <ul style="list-style-type: none"> Identify solids, liquids and gases using their properties. 	<p><u>Earth and Space</u></p> <ul style="list-style-type: none"> Describe the geocentric and heliocentric models. Name and describe the shape of celestial bodies. 	<p><u>Evolution and Inheritance</u></p> <ul style="list-style-type: none"> Define and identify variation in organisms and recall that it is caused by inherited and environmental factors.



Science Knowledge and Skills Progression

	<ul style="list-style-type: none"> • Group rocks by their absorbency, hardness and reaction to acid rain (vinegar). • List the different factors that break down rocks. • Describe fossil formation and identify fossils in rocks. • Describe the work of a palaeontologist. • Name, describe and compare some different categories of soil. • List some of the benefits of earthworms to the soil. • Identify and describe the comparative size and weight of the layers in a sedimentation jar. 	<ul style="list-style-type: none"> • Describe melting, freezing, condensing and evaporating. • Describe the different stages of the water cycle. • Describe how temperature affects the rate of evaporation and therefore the water cycle. 	<ul style="list-style-type: none"> • Describe the orbits of celestial bodies in the Solar System and name the force that keeps them in their orbits. • Describe the orbit of the Moon around the Earth and its phases. • Explain how day and night occur. • Explain how the seasons occur. • Explain how a sundial works. • List some of the uses of satellites and explain why space junk poses a problem to them. 	<ul style="list-style-type: none"> • Recall that living things produce offspring of the same kind but are not normally identical to their parents. • Describe patterns of inheritance from parent to offspring in a given example or family tree. • Describe what an adaptation is; it cannot be chosen and is usually inherited. • Describe key characteristics that would help an organism to survive and explain how an adaptation helps the organism to survive. • Explain how variation may affect survival within a population and recall what natural selection means. • Recall what evolution is, identify differences between a living thing and its ancestor and describe key steps in the evolution of a species. • Recall different types of evidence that can be used to explain evolution and describe methods that make scientists' results or conclusions more trustworthy.
Spring 2	<u>Light and Shadows</u>	<u>Sound and Vibrations</u>	<u>Lifecycles and Reproduction</u>	<u>Circuits, Batteries and Switches</u>



Science Knowledge and Skills Progression

	<ul style="list-style-type: none">● Recall examples of light sources, objects that do not give out light and that darkness is the absence of light.● Describe ways to protect eyes from harm.● Describe what happens when light reflects, give examples of reflective surfaces or materials and describe factors that may affect the quality of a reflected image.● Describe how shadows form and identify patterns between groups of materials and the shadows produced.● Recall factors that affect the way a shadow appears, including what causes shadows to change throughout the day and factors that change the size of a shadow● Describe the pattern of changing shadows throughout the day.● Describe how the light source's distance		<ul style="list-style-type: none">● Describe the life cycle of a plant, including the reproductive stage.● Describe the life cycle of a mammal.● Describe the life cycle of a bird and compare it with that of a mammal.● Describe the life cycle of an amphibian.● Describe the life cycle of an insect and compare it with that of an amphibian.● Describe asexual reproduction in plants.	<ul style="list-style-type: none">● Describe the function of key electrical components and explain how the models used in the lesson represent these.● Correctly predict if an electrical circuit will work or not, explaining why using their knowledge of complete loops, power sources and presence of components.● Describe the relationship between the number of bulbs in a circuit, the bulb brightness and the amount of resistance.● Explain that increasing the number of components increases the resistance, affecting the flow of current and energy transferred.● Identify that batteries are a voltage source; they come in different voltages, affecting bulb brightness.● Describe that voltage can be changed using different numbers of cells in a circuit and that more cells or a higher voltage causes brighter bulbs.● Use the relationship between voltage and bulbs to predict what will happen with buzzers and motors.
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Science Knowledge and Skills Progression

	<p>affects the shadow's size.</p> <ul style="list-style-type: none"> ● Explain why a particular material is appropriate to make a shadow puppet and use knowledge of shadows to animate it. 			<ul style="list-style-type: none"> ● Build an electrical circuit with a switch to control its function, explain how the switch and the electrical circuit solve the problem and recall different examples of problems that can be solved using an electrical circuit.
Summer 1	<p><u>Plant Reproduction</u></p> <ul style="list-style-type: none"> ● Identify what plants need to grow healthily. ● Describe the structure and function of the parts of flowering plants. ● Investigate how plants transport water. ● Describe the life cycle of a flowering plant. ● Explain seed dispersal methods. 	<p><u>Classification and Changing Habitats</u></p> <ul style="list-style-type: none"> ● Group animals in various ways, including vertebrates (mammals, birds, reptiles, amphibians, fish) and invertebrates. ● Group plants in various ways, including flowering and non-flowering plants. ● Recognise and describe different habitats and their inhabitants. ● Recognise the impact humans can have on habitats. ● Recognise the impact of natural disasters on habitats. 	<p><u>Unbalanced Forces</u></p> <ul style="list-style-type: none"> ● Describe gravity and its effects. ● Describe the relationship between mass and gravity. ● Describe air resistance and its effects. ● Describe friction and its effects. ● Describe water resistance and its effects. ● Describe the relationship between surface area and air and water resistance. ● Explain how to make an object aerodynamic or streamlined. ● Describe the effects of levers, pulleys and simple machines on movement. 	<p><u>Circulation and Health</u></p> <ul style="list-style-type: none"> ● Recall factors that improve someone's health and those that impact health negatively and suggest improvements to someone's health. ● Describe the circulatory system as the heart and blood vessels transporting blood around the body and recall that the heart is a pump that pushes blood through the circulatory system. ● Describe the pathway of blood through the circulatory system, including passing through the heart twice in a complete circuit through the body. ● Describe some of the functions of blood, including transporting substances like oxygen, water and nutrients around the body. ● Recall what is meant by heart rate and research using multiple



Science Knowledge and Skills Progression

				<p>websites to find reliable animal masses.</p> <ul style="list-style-type: none"> ● Identify the pattern between animals' size and heart rate and quote values as evidence. ● Describe how different exercises affect heart rate and explain why heart rate changes during exercise. ● Describe what happens to heart rate during and after exercise and compare two sets of heart data to identify a link between heart rate and fitness.
Summer 2	<p><u>Does hand span affect strength grip?</u></p> <ul style="list-style-type: none"> ● Recall key knowledge from previous units. ● Apply knowledge in new contexts. 	<p><u>How does the flow of liquids compare?</u></p> <ul style="list-style-type: none"> ● Recall key knowledge from previous units. ● Apply knowledge in new contexts. 	<p><u>Human timeline</u></p> <ul style="list-style-type: none"> ● Order the stages in growth and development from birth to old age. ● Describe physical and developmental changes from a baby through to old age. ● Describe changes that occur in males and females during puberty. ● Suggest ways to manage the changes that occur during puberty. ● Recall what is meant by a gestation period. 	<p><u>Are some sunglasses safer than others?</u></p> <ul style="list-style-type: none"> ● Recall key knowledge from previous units. ● Apply knowledge in new contexts.



Science Knowledge and Skills Progression

			<ul style="list-style-type: none"> Describe how gestation varies across animals and compare this to humans. <p><u>Does the size of an asteroid affect its impact strength?</u></p> <ul style="list-style-type: none"> Recall key knowledge from previous units. Apply knowledge in new contexts. 	
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Working Scientifically				
	Year 3	Year 4	Year 5	Year 6
Autumn 1	<p><u>Movement and Nutrition</u></p> <ul style="list-style-type: none"> Record measurements of different bones and use the data to sort them into size order. Describe some ways scientific research has improved the field of bionics/prosthetics, such as the choice of materials or linking their movement to muscles in the arm. Find relevant data on food packaging and make numerical comparisons 	<p><u>Digestions and Food</u></p> <ul style="list-style-type: none"> Evaluate a strength or weakness of the digestive system model. Describe an example of evidence that can be used to study teeth. Identify some of the variables that need to be kept the same, predict an outcome and identify limitations to the experiment. Recall that scientific research needs repeated results before use in society. Identify trends in a predator-prey graph. 	<p><u>Mixtures and Separation</u></p> <ul style="list-style-type: none"> Research a mixture to find out what substances it is made from. Draw and annotate a diagram to explain how sieving separates a solid-solid mixture. Identify and justify which type of enquiry to use to answer my testable question. Identify solutions by observing and describing their appearance. Suggest which variables to change, measure and control when investigating 	<p><u>Classifying Big and Small</u></p> <ul style="list-style-type: none"> Use a classification key to group and identify organisms. Make a simple classification key.



Science Knowledge and Skills Progression

		<ul style="list-style-type: none"> Draw a results table that has space for observations about different poo samples. 	<p>how temperature affects the time taken to dissolve.</p> <ul style="list-style-type: none"> Choose which measurements to take and how long to take them for. 	
Autumn 2	<p><u>Forces and Magnets</u></p> <ul style="list-style-type: none"> Use arrows and scientific vocabulary to show the direction of a contact force. Use evidence to support conclusions. Identify the variables to change, measure and control. Write a method to explain how to use a magnet to sort and classify materials as magnetic or non-magnetic. Label the axes of a bar chart. Draw bars on a chart accurately. Identify key information from a source. Use more than one source to research a question. 	<p><u>Electricity and Circuits</u></p> <ul style="list-style-type: none"> Draw a results table and record a range of appliances under the correct headings 'Mains' or 'Batteries'. Identify and draw simplified electric circuit symbols and use these to draw a simplified circuit diagram. Write a method for the investigation that considers appropriate equipment, ordering clearly written steps and considering safety. Pose questions relating to bulbs in an electrical circuit. Explain why a selected question is testable. Suggest that new inventions will change safety advice. 	<p><u>Properties and Changes</u></p> <ul style="list-style-type: none"> Evaluate the hardness test to determine the degree of trust in the results. Plan and draw a table of results. Write a detailed, organised and easy to follow method. Write a prediction using prior knowledge of the states of matter. Analyse observations about rusting and use them to support a conclusion. Measure accurately in centimetres. 	<p><u>Light and Reflection</u></p> <ul style="list-style-type: none"> Make observations about the properties of light. Use my observations as evidence to support conclusions about light. Draw ray diagrams. Pose testable questions in response to observations. Record my measurements as a line graph. Use my line graph to extrapolate data and make predictions about missing values. Recall various jobs or inventions that use mirrors and reflection.
Spring 1	<u>Rocks and Soil</u>	<u>States of Matter</u>	<u>Earth and Space</u>	<u>Evolution and Inheritance</u>



Science Knowledge and Skills Progression

	<ul style="list-style-type: none"> ● Use a magnifying glass correctly to observe the appearance of a rock in detail. ● Use results to choose the appropriate rock type for a specific use, suggest a better choice of rock for a specific use and to predict how a rock will be affected by the weather. ● Research and present information on fossil formation using a single source. ● Use a model of the fossil record to determine the relative age of a fossil, to suggest how a living thing has changed over time and to suggest what living things were around in a certain era. ● Draw and label the bars on a bar chart. ● Accurately draw and label the layers of sediment in a sedimentation jar. 	<ul style="list-style-type: none"> ● Ask relevant questions. ● Use results to draw simple conclusions. ● Use thermometers to take accurate measurements. ● Make predictions for new values. ● Record findings using labelled diagrams. ● Research using more than one source. 	<ul style="list-style-type: none"> ● Pose and identify testable questions about the movement of the celestial bodies in our Solar System. ● Use a model to represent the Solar System. ● Design and draw a table to record data on moons. ● Accurately draw day and night and seasons diagrams. ● Calibrate a sundial using a compass and torch and use it to measure time. ● Analyse patterns in temperature data for the Earth and use them to predict temperature values for the Earth in the future. 	<ul style="list-style-type: none"> ● Sort variation as environmental, inherited or a mixture of both. ● Evaluate a method by recalling variables that were effectively kept the same and those that were harder to control. ● Comment on the reliability of the results and the degree of trust. ● Consider how evidence is used to form theories and the degree of trust the evidence offers.
Spring 2	<u>Light and Shadows</u>	<u>Sound and Vibrations</u>	<u>Lifecycles and Reproduction</u>	<u>Circuits, Batteries and Switches</u>



Science Knowledge and Skills Progression

	<ul style="list-style-type: none">● Recall what information needs recording to decide the number of columns in a results table and suggest suitable headings for the results table.● Record information in the correct columns.● Identify if a question is testable, explain why and plan ways to answer a testable question.● Identify and explain why something is an advantage or disadvantage of a method and suggest an improvement to the experiment.● I can describe patterns in data and quote values as evidence of patterns in data.● I can identify odd results that do not fit the pattern.● I can use patterns to make predictions for missing data.	<ul style="list-style-type: none">● Record data in different ways.● Apply and create classification keys.● Make careful observations.● Make and use classification keys.● Present information in different ways.● Research using an information sheet	<ul style="list-style-type: none">● Observe and compare equivalent parts in different flowers.● Research the life cycles of different mammals.● Pose questions to compare the life cycles of different birds.● Suggest how one temperature may affect egg hatching.● Use data to describe a relationship and make predictions.● Represent root growth over time on a line graph.	<ul style="list-style-type: none">● Draw circuit diagrams with straight lines and using standard circuit symbols.● Design a results table with an appropriate number of columns and headings with units.● Identify the changed, measured and control variables in an enquiry to plan a method
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Science Knowledge and Skills Progression

<p>Summer 1</p>	<p><u>Plant Reproduction</u></p> <ul style="list-style-type: none"> ● Pose relevant questions. ● Design and record in results tables. ● Plan a simple enquiry. ● Complete, read and interpret data in a bar chart. ● Identify and suggest changes to an enquiry. ● Use results to draw conclusions. 	<p><u>Classification and Changing Habitats</u></p> <ul style="list-style-type: none"> ● Record data in different ways. ● Apply and create classification keys. ● Make careful observations. ● Make and use classification keys. ● Present information in different ways. ● Research using an information sheet. 	<p><u>Unbalanced Forces</u></p> <ul style="list-style-type: none"> ● Analyse predictions, data and anomalies to write a conclusion. ● Plan a fair test to investigate air resistance. ● Write a method. ● Evaluate a method and judge the degree of trust. ● Design a results table. ● Calculate the mean average from repeat data. ● Draw and annotate a diagram. ● To draw an accurate line graph. 	<p><u>Circulation and Health</u></p> <ul style="list-style-type: none"> ● Evaluate the trustworthiness of secondary sources that provide health advice. ● Evaluate the model blood by considering a strength and a weakness when representing blood and suggesting improvements. ● Compare class values and recognise when they do not match. ● Use identified patterns to predict new values. ● Write a method for an enquiry with consideration of equipment, the different versions of the changed variable and how to complete the measured variable. ● Choose a suitable title and axis labels with units for the line graph and plot points on the line graph.
<p>Summer 2</p>	<p><u>Does hand span affect strength grip?</u></p> <ul style="list-style-type: none"> ● Carry out a full scientific enquiry. 	<p><u>How does the flow of liquids compare?</u></p> <ul style="list-style-type: none"> ● Carry out a full scientific enquiry 	<p><u>Human timeline</u></p> <ul style="list-style-type: none"> ● Use data to describe growth from baby to adult. 	<p><u>Are some sunglasses safer than others?</u></p> <ul style="list-style-type: none"> ● Carry out a full scientific enquiry



Science Knowledge and Skills Progression

			<ul style="list-style-type: none"> Identify where on the graph the rate of growth changes. Use a line graph to make predictions about height. Choose a suitable title and axes labels for the scatter graph and plot data on the scatter graph. <p><u>Does the size of an asteroid affect its impact strength?</u></p> <ul style="list-style-type: none"> Carry out a full scientific enquiry. 	
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Science in action				
	Year 3	Year 4	Year 5	Year 6
Autumn 1	<ul style="list-style-type: none"> To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. 	<ul style="list-style-type: none"> To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. To know about science in the news and recent discoveries. 	<ul style="list-style-type: none"> To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. To know about science in the news and recent discoveries. 	<ul style="list-style-type: none"> To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. To know about science in the news and recent discoveries. To know there are spiritual, moral, social and cultural links with Science.



Science Knowledge and Skills Progression

	<ul style="list-style-type: none">● To know about science in the news and recent discoveries.● To know there are spiritual, moral, social and cultural links with Science.● To know about the methods and equipment used by scientists throughout history and how these have led to modern methods.● To know how scientific knowledge has changed over time, leading to the current understanding of Science.● To know about current scientific research and what it aims to achieve in the future.● To know that mistakes can lead to new discoveries.● To know that collaboration and peer reviewing is essential for effective scientific progress.	<ul style="list-style-type: none">● To know there are spiritual, moral, social and cultural links with Science.● To know about the methods and equipment used by scientists throughout history and how these have led to modern methods.● To know how scientific knowledge has changed over time, leading to the current understanding of Science.● To know about current scientific research and what it aims to achieve in the future.● To know that mistakes can lead to new discoveries.● To know that collaboration and peer reviewing is essential for effective scientific progress.	<ul style="list-style-type: none">● To know there are spiritual, moral, social and cultural links with Science.● To know about the methods and equipment used by scientists throughout history and how these have led to modern methods.● To know how scientific knowledge has changed over time, leading to the current understanding of Science.● To know about current scientific research and what it aims to achieve in the future.● To know that mistakes can lead to new discoveries.● To know that collaboration and peer reviewing is essential for effective scientific progress.● To know how scientific evidence is used to support or refute ideas or arguments.	<ul style="list-style-type: none">● To know about the methods and equipment used by scientists throughout history and how these have led to modern methods.● To know how scientific knowledge has changed over time, leading to the current understanding of Science.● To know about current scientific research and what it aims to achieve in the future.● To know that mistakes can lead to new discoveries.● To know that collaboration and peer reviewing is essential for effective scientific progress.● To know how scientific evidence is used to support or refute ideas or arguments.
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