



Shelton Junior School

LKS2 Science Long-Term Progression of Knowledge and Skills



	DISCOVER – resilience and collaboration	INVESTIGATE – reflection and concentration	EXPLORE - curiosity
Year A	Heroic Heritage – Why are beliefs important?	Nurturing Nature – How do plants and living things flourish?	Go With The Flow – How do people choose where to settle?
	<p>Rocks & fossils (Y3) Chemistry</p> <ul style="list-style-type: none"> ✓ I can compare and group rocks based on their appearance and physical properties, giving reasons ✓ I can recognise how soil is made and describe how fossils are formed ✓ I can recognise the difference between sedimentary, metamorphic and igneous rocks 	<p>Animals, including humans (Y3) Biology</p> <ul style="list-style-type: none"> ✓ I can explain the importance of a nutritious, balanced diet ✓ I can understand how nutrients, water and oxygen are transported within animals and humans ✓ I can identify the skeletal and muscular system of a human <p>Plants (Y3) Biology</p> <ul style="list-style-type: none"> ✓ I can explain the function of different parts of flowering plants and trees ✓ I can explain how water is transported within plants ✓ I can explain the plant life cycle, especially the importance of flowers 	<p>Light (Y3) Physics</p> <ul style="list-style-type: none"> ✓ I can recognise that dark is the absence of light ✓ I can notice that light is needed in order to see and is reflected from a surface ✓ I can recognise and can demonstrate how a shadow is formed and find patterns in the way a shadow changes shape ✓ I can recognise the dangers of direct sunlight and can explain how to keep protected
Scientific enquiry	<p>Rocks and fossils (Y3) Chemistry Using a hand lens/microscope to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them Enquiry type: Identifying, grouping and classifying</p> <p>Observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time Enquiry type: Observing over time/ Research using secondary sources</p>	<p>Animals, including humans (Y3) Biology Identify and group animals with and without skeletons and observe and compare their movement Enquiry type: Identifying, grouping and classifying/ Research using secondary sources</p> <p>Plants (Y3) Biology Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser etc. Enquiry type: Comparative/fair test</p>	<p>Light (Y3) Physics</p> <p>Explore what happens when light reflects off a mirror or other reflective surfaces. Use mirrors to help them answer questions about how light behaves Enquiry type: Observing over time/ Pattern seeking</p> <p>Look for patterns in shadows when a light source moves or the distance between the light source and the object changes. Enquiry type: Pattern seeking</p>

	Incredible Invaders – Why do people always want more?	Magnets and Matter – Are all changes irreversible?	Active Planet – How do we control our emotions?
Year B	<p>Sound (Y4) Physics</p> <ul style="list-style-type: none"> ✓ I can identify how sound is made, associating some of them with vibrating ✓ I can recognise how sound travels from a source to our ears ✓ I can find patterns between pitch and the object producing a sound ✓ I can find patterns between the volume of a sound and the strength of the vibrations that produced it ✓ I can recognise what happens to a sound as it travels away from its source <p>Electricity (Y4) Physics</p> <ul style="list-style-type: none"> ✓ I can identify and name appliances that require electricity to function ✓ I can construct a series circuit ✓ I can identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) ✓ I can predict and test whether a lamp will light within a circuit ✓ I can recognise the function of a switch ✓ I can recognise the difference between a conductor and an insulator; giving examples of each 	<p>States of matter (Y4) Chemistry</p> <ul style="list-style-type: none"> ✓ I can observe and explore the temperature at which materials change state ✓ I can observe and explore how some materials can change state ✓ I can compare and group materials together based on their state of matter (solid, liquid, gas) ✓ I can identify the part played by evaporation and condensation in the water cycle <p>Forces & magnets (Y3) Physics</p> <ul style="list-style-type: none"> ✓ I can compare how things move on different surfaces ✓ I can notice how some forces require contact and some do not, giving examples ✓ I can describe magnets having two poles ✓ I can observe how magnets attract and repel each other, depending on which way the poles are facing ✓ I can compare and group together a variety of everyday materials on the basis of whether they are magnetic and identify some magnetic materials ✓ I can predict whether two magnets will attract or repel each other 	<p>Animals, including humans (Y4) Biology</p> <ul style="list-style-type: none"> ✓ I can identify and name the parts of the human digestive system ✓ I can describe the functions of the organs in the human digestive system ✓ I can identify and know the different types of human teeth and their functions ✓ I can construct food chains to identify producers, predators and prey <p>Living things and their habitats (Y4) Biology</p> <ul style="list-style-type: none"> ✓ I can recognise that living things can be grouped in a variety of ways ✓ I can use classification keys to group, identify and name living things ✓ I can recognise how changes to an environment could endanger living things
Scientific enquiry	<p>Sound (Y4) Physics Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound Enquiry type: Comparative/fair test</p> <p>Electricity (Y4) Physics Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit Enquiry type: Pattern seeking</p>	<p>States of matter (Y4) Chemistry Observe and record evaporation over a period of time, for example, a puddle, or washing on a line, and investigate the temperature on washing/drying Enquiry type: Observing over time</p> <p>Forces & magnets (Y3) Physics Carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers to their questions. Enquiry type: Comparative/fair test</p>	<p>Animals, including humans (Y4) Biology Present to the class their ideas about the digestive system using models or images Enquiry type: Research using secondary sources</p> <p>Living things and their habitats (Y4) Biology Making a guide to local living things in Derby Enquiry type: Identifying, grouping and classifying</p>

Enquiry types



COMPARATIVE & FAIR TESTING



IDENTIFYING, CLASSIFYING & GROUPING




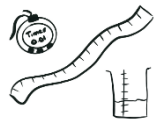


OBSERVING OVER TIME



PATTERN SEEKING



RESEARCHING USING SECONDARY SOURCES

	Year 3 Skills	Year 4 Skills
<p>Asking questions to set up investigations</p> 	<ul style="list-style-type: none"> • Begin to ask some relevant questions using scientific language. • Begin to make some decisions about which type of enquiry will be the best way of answering questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. • With support and scaffolds, record the main parts of how to set up and complete an investigation (question, prediction, equipment, method). • Make a prediction based on everyday experiences. • With support, set up simple comparative and fair tests. Make a choice from a list of things (variables) to change when conducting a fair test. • Begin to identify the main parts of a method and the order of steps. 	<ul style="list-style-type: none"> • Ask a range of relevant questions using scientific language. • Make decisions about which type of enquiry will be the best way of answering questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. • With scaffolds, record the main parts of how to set up and complete an investigation (question, prediction, equipment, method). • Make a prediction based on knowledge acquired from previous science learning and observations. • Begin to make decisions of when to set up a simple comparative test or fair tests. • Begin to decide what to change and measure/observe (variables) • Identify the main parts of a method and the order of steps and begin to explain their decisions.
<p>Observing and measuring</p> 	<ul style="list-style-type: none"> • Make systematic observations using a range of equipment, including thermometers, measuring cylinders, pipettes, timers. • Make some decisions about which equipment to use and use equipment correctly. • Make some decisions about what to observe and how long to make observations for. • Begin to take accurate measurements using a range of standard units (of time, m, cm, mm, g, l, ml, °C). 	<ul style="list-style-type: none"> • Make careful and systematic observations using a range of equipment including, thermometers and data loggers. • Decide which equipment to use and use it correctly. • Make more decisions about what observations to make and how long to make them for. • Take accurate measurements using a range of standard units (m, cm, mm, g, l, ml, °C, dB) and begin to record using decimal numbers.
<p>Recording data and communicating results</p> 	<ul style="list-style-type: none"> • Begin to record findings using simple scientific language, drawings, labelled diagrams, bar charts (using scales chosen by teacher), and tables. • Gather, record and present data to help in answering questions. • With support, briefly report on findings from enquiries, including oral and written explanations (in note form or with writing frames). 	<ul style="list-style-type: none"> • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts (scale agreed through whole class discussions), and tables. • Gather, record, classify and present data in a variety of ways to help in answering questions and with support select the most useful way to do this. • Report on findings from enquiries in more detail, including oral and written explanations, displays or presentations
<p>Drawing conclusions</p>  <p>Explain</p>	<ul style="list-style-type: none"> • State why something happened using the word 'because', linking cause and effect and using simple scientific vocabulary. • Begin to look for differences, similarities, changes and simple patterns in their observations, data, charts or graph. • Use results to consider whether their prediction was correct. • With support, use results to draw simple conclusions. • With support, use some straightforward scientific evidence to support findings and to answer questions. • With support, use results to make predictions for new values and raise further questions. • Begin to recognise when a test is unfair and suggest improvements. 	<ul style="list-style-type: none"> • Explain why something happened using the word 'because', linking cause and effect and using simple scientific vocabulary. • Look for differences, similarities, changes and simple patterns in their observations, data, charts or graph. • Use results to consider whether their prediction was correct. • Use results to draw simple conclusions. • Use some straightforward scientific evidence to support findings and to answer questions. • Use results to make predictions for new values and raise further questions. • Recognise when a test is unfair and use results to suggest improvements.



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UKS2 Science Long-Term Progression of Knowledge and Skills



	DISCOVER – resilience and collaboration	INVESTIGATE – reflection and concentration	EXPLORE - curiosity
Year A	Seeking Safety – Does adversity always make you stronger?	Stayin’ Alive – Are all living things equal?	The Amazing Americas – Do we always appreciate what we’ve got?
	<p>Light (Y6) Physics</p> <ul style="list-style-type: none"> ✓ I can recognise how light travels ✓ I can 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 ✓ I can explain that we see things because light travels from light sources to objects and then to the eyes ✓ I can use the idea that light travels in straight lines to explain why shadows have the same shape as the object that casts them ✓ I can recognise how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. ✓ Design and make a periscope using the idea that light appears to travel in straight lines to explain how it works 	<p>Living things and their habitats (Y5) Biology</p> <ul style="list-style-type: none"> ✓ I can describe the life cycle of different living things e.g. mammal, amphibian, insect and bird ✓ I can describe the differences between different life cycles ✓ I can describe the process of reproduction in plants <p>Animals, including humans (Y5) Biology</p> <ul style="list-style-type: none"> ✓ I can describe the changes as humans develop to old age <p>Animals, including humans (Y6) Biology</p> <ul style="list-style-type: none"> ✓ I can identify and name the main parts of the human circulatory system ✓ I can describe the function of the heart, blood vessels and blood ✓ I recognise the impact of diet, exercise, drugs and lifestyle on health ✓ I can describe the ways in which nutrients and water are transported in animals, including humans 	<p>Electricity (Y6) Physics</p> <ul style="list-style-type: none"> ✓ I can compare and give reasons for why components work and do not work in a circuit ✓ I can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit ✓ I can 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 ✓ I can use recognised symbols when representing a simple circuit in a diagram.
Scientific enquiry	<p>Light Y6 Measure shadows cast by different objects. Look for patterns Enquiry type: Pattern seeking Comparative/Fair test</p> <p>Light Y6 Design and make a periscope using the idea that light appears to travel in straight lines to explain how it works Enquiry type: Research using secondary sources</p>	<p>Living things and their habitats Y5 Observe life-cycle changes in a variety of living things e.g. plants. Enquiry type: Observing over time</p> <p>Living things and their habitats Y5 Compare life-cycles of living things in our local environment to other living things from around the world Enquiry type: Research using secondary sources Identifying, classifying and grouping</p> <p>Animals, including humans Y6 Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health Enquiry type: Research using secondary sources Pattern seeking</p>	<p>Electricity Y6 Identify the effect of changing one component at a time in a circuit Enquiry type: Comparative/fair test</p> <p>Electricity Y6 Construct a burglar alarm and explain how it works Enquiry type: Comparative/fair test</p>
Year B	Ancient Civilisations – Why do people have different beliefs?	Survival of the Fittest – What’s the difference between surviving and living?	Amazon Adventures – Why do people explore?

	<p>Properties and changes of materials (Y5) Chemistry</p> <ul style="list-style-type: none"> ✓ I can compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity [electrical & thermal], and response to magnets) ✓ I know and can demonstrate that some changes are reversible and some are not ✓ I use my knowledge of solids, liquids and gases to decide how mixtures might be separated ✓ I can explain how some materials can be separated (e.g. through filtering, sieving and evaporation) ✓ I know and can demonstrate that some changes are reversible and some are not ✓ I can explain how some changes result in the formation of a new material and that this is usually irreversible ✓ I understand and can explain how a material dissolves to form a solution and how to recover a substance from a solution 	<p>Living things and their habitats (Y6) Biology</p> <ul style="list-style-type: none"> ✓ I can describe how living things are classified into broad groups based on observable characteristics, including micro-organisms, plants and animals ✓ I can describe similarities and differences ✓ I can give reasons for classifying plants and animals based on specific characteristics <p>Evolution and inheritance (Y6) Biology</p> <ul style="list-style-type: none"> ✓ I can recognise that the Earth and living things have changed over time ✓ I can recognise that fossils can be used to find out about the past ✓ I can recognise that living things produce offspring of the same kind, but offspring normally vary and are not identical to their parents ✓ I can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution 	<p>Forces (Y5) Physics</p> <ul style="list-style-type: none"> ✓ I can explain what gravity is and its impact on our lives ✓ I can identify and know the effect of air and water resistance ✓ I can identify and know the effect of friction ✓ I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect <p>Earth and space (Y5) Physics</p> <ul style="list-style-type: none"> ✓ I can describe the movement of the Earth and other planets relative to the Sun ✓ I can describe the movement of the Moon relative to the Earth ✓ I can describe the Sun, Earth and Moon (using the term spherical) ✓ I can use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
<p>Scientific enquiry</p>	<p>Properties and changes of materials Y5 Carry out tests to answer questions, for example: 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?'</p> <p>Enquiry type: Comparative/fair test and Identifying, grouping and classifying</p> <p>Properties and changes of materials Y5 Observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes</p> <p>Enquiry type: Observing over time</p>	<p>Living things and their habitats Y6 Use classification systems and keys to identify some animals and plants in the immediate environment.</p> <p>Enquiry type: Identifying, classifying and grouping</p> <p>Evolution and adaptation/inheritance Y6 Compare how some living things are adapted to survive in extreme conditions, for example: cactus, camel, polar bear</p> <p>Enquiry type: Research using secondary sources</p>	<p>Forces Y5 Design and make a variety of parachutes, carrying out fair tests to determine which designs are the most effective.</p> <p>Enquiry type: Comparative/fair test</p> <p>Earth and Space Y5 Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day</p> <p>Enquiry type: Observing over time/ Pattern seeking</p>

Enquiry types



COMPARATIVE & FAIR TESTING



IDENTIFYING, CLASSIFYING & GROUPING




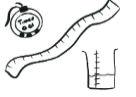


OBSERVING OVER TIME



PATTERN SEEKING



RESEARCHING USING SECONDARY SOURCES

	Year 5 Skills	Year 6 Skills
<p>Asking questions to set up investigations</p> 	<ul style="list-style-type: none"> • Begin to ask some significant scientific questions based on scientific concepts, which take account of what has been learned previously • Begin to plan different types of scientific enquiries to answer questions: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations, including recognising and controlling variables); and researching using secondary sources. • Know what the variables are in a given enquiry. • Isolate the variables when investigating. • With increasing independence, plan and carry out practical enquiries, including recognising and controlling variables. • Recognise when it is appropriate to set up a fair test. • Identify the full method and explain their decisions. • Begin to suggest improvements to a method. • Record how to set up and complete investigations (question, predictions, variables, equipment, method). • Suggest more than one possible prediction and begin to suggest which is the most likely. • Justify their prediction using some scientific knowledge and understanding. 	<ul style="list-style-type: none"> • Ask a range of significant scientific questions based on scientific concepts, which take account of what has been learned previously. • Plan the most appropriate type of scientific enquiry to answer questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations, including recognising and controlling variables); and researching using secondary sources. • Know what the variables are in a given enquiry and can isolate each one when investigating. • Justify which variable has been isolated in the scientific investigation • Independently: select, plan and carry out practical enquiries including, recognising and controlling variables and explaining why these variables need to be controlled. • Identify the full method, suggest improvements to it and give reasons for the method and these improvements. • Independently record how to set up and complete a range of investigations (question, predictions/hypotheses, variables, equipment, method). • Make a hypothesis stating how one thing will affect another and give reason for the suggestion using secure scientific knowledge and understanding.
<p>Observing and measuring</p> 	<ul style="list-style-type: none"> • Begin to choose the most appropriate equipment from a range of scientific equipment and explore its uses • Begin to make their own decisions about what to observe and how long to make observations for. • Begin to take measurements with increasing accuracy and precision, taking repeat readings when appropriate. • Begin to decide on the best unit of measure to record data in. 	<ul style="list-style-type: none"> • Choose the most appropriate equipment and explain how to use it accurately. • Explain how to get a precise and accurate measure from different equipment. • Make their own decisions about what to observe and length of observations. • Take measurements with increasing accuracy and precision, and know when it is appropriate to take repeat readings and justify this. • Decide on the most appropriate unit of measure and explain why it is the most appropriate.
<p>Recording data and communicating results</p> 	<ul style="list-style-type: none"> • Begin to decide how to record data and results from a range of familiar approaches. • Begin to record data and results of increasing complexity using relevant scientific language; scientific diagrams and labels; tables, bar and line graphs (scale agreed through group discussions). • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and presentations. • Able to present information related to scientific enquiries in a range of ways including using IT such as PPT and video presentation. • Use diagrams, as and when necessary, to support writing. 	<ul style="list-style-type: none"> • Choose the most effective way to record data and results from a range of choices. • Record data and results of increasing complexity using relevant scientific language; scientific diagrams and labels; classification keys; tables, scatter graphs, bar and line graphs (scale agreed independently). • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and presentations. • Able to present information related to scientific enquiries in a range of ways including using IT such as PPT and Windows Movie Maker. • Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases. • Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class.
<p>Drawing conclusions</p>  <p>Explain</p>	<ul style="list-style-type: none"> • Explain why something happened, identifying casual relationships and using relevant scientific vocabulary • Identify patterns in their data/charts and begin to look for casual relationships in data. • Begin to spot unexpected results which don't fit the pattern. • Comment on results and whether they support the initial prediction. • Begin to identify scientific evidence that has been used to support or refute ideas or arguments. • Begin to use test results to make a prediction to set up a further comparative or fair test. • Compare their results with others and comment on how reliable they are. 	<ul style="list-style-type: none"> • Explain in detail why something happened, identifying casual relationships and using relevant scientific vocabulary • Identify patterns in their data/charts and look for casual relationships in data. • Spot unexpected results that don't fit the pattern and suggest reasons for this. • Comment on results and whether they support the initial prediction. • Identify scientific evidence that has been used to support or refute ideas or arguments. • Use test results to make predictions to set up further comparative and fair tests. • State how confident they are that their results are reliable and give reasons for this. • Describe how to improve planning to get more reliable results.