

Working Scientifically Progression Summary

The identified knowledge of the science curriculum at Vernon Primary follows the progression outlined in the National Curriculum. The skills that children will develop throughout the programme of study are also progressive and are informed by the Association of Science Education (ASE) Planning Matrices as well as the National Curriculum for Science.

Year 1					
Autumn		Spring		Summer	
Plants: identify and name a variety of plants and trees. Describing the basic structure of flowering plants and trees.	Seasonal Changes: observe and describe weather associated with the seasons and how day length varies.	Everyday Materials: describe and compare the simple physical properties of a variety of everyday materials based on their physical properties.	Enquiry Unit – everyday materials	Animals including humans: identify, name and compare a variety of common animals including fish, amphibians, reptiles, birds and mammals.	Seasonal Changes CONTINUED: observe and describe weather associated with the seasons and how day length varies.
<p>Sorting and grouping parts of plants using similarities and differences e.g., the shape of leaves, the colour of the flower/blossom.</p> <p>Using simple charts and Venn diagrams to identify and classify plants.</p> <p>Using photographs and their own observations to talk about how plants change over time (e.g., seed to sapling to tree) and over the year (deciduous and fruit bearing trees).</p> <p>Planting seeds and observing how they grow and change by making simple observations.</p> <p>Pointing to and naming the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green, the leaves are different shapes.</p>	<p>Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment (such as a container to measure rainfall)</p> <p>Use data to create a pictogram and use this to describe changes in day length over the seasons.</p> <p>Use their evidence to describe some other features of the weather, surroundings, themselves, animals, and plants found in autumn.</p> <p>Demonstrate their knowledge in different ways e.g. creating seasonal artwork, creating a pictogram (and use this to ask and answer related questions)</p>	<p>Comparing and grouping together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Classifying objects made of one material in different ways e.g. a group of objects made of metal.</p> <p>Classifying one type of object made from a range of materials e.g. a collection of spoons made of different materials.</p> <p>Choosing an appropriate method for testing an object for a particular property.</p> <p>Using test evidence to answer the questions about properties e.g. Which cloth is the most absorbent?</p> <p>Testing the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.</p>		<p>Making first hand close observations of animals from each of the groups (city farm)</p> <p>Comparing the structure of two animals from the same or different group e.g. wings, feathers, vertebrates/invertebrates.</p> <p>Classifying animals, using a range of features e.g. lay eggs/give birth to live young, herbivore, omnivore</p> <p>Identify animals by matching statements to named images</p> <p>Taking measurements of parts of the body and present results in a table to interpret. Conducting simple sense experiments. (e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?)</p>	<p>Collecting information about the weather regularly throughout the year.</p> <p>Presenting information in tables and charts to compare the weather across the seasons. Collecting information of features that change with the seasons e.g. plants, animals, humans</p> <p>Present this information in different ways to compare the seasons.</p> <p>Gathering data about day length regularly throughout the year and present this to compare the seasons.</p> <p>Using gathered evidence to describe the general types of weather and changes in day length over the seasons.</p> <p>Using evidence to describe some other features of their surroundings, themselves, animals, plants that change over the seasons.</p> <p>Demonstrating knowledge in different ways e.g. creating seasonal artwork.</p>
Year 2					
Autumn		Spring		Summer	
Uses of everyday materials: identify and compare the suitability of a variety of everyday materials. Finding out how the shapes of solid objects made from some materials, can be changed.	Enquiry Unit - uses of everyday material.	Plants: observe and describe how seeds and bulbs grow into mature plants.	Animals including humans: describe the basic needs of animals, including humans, for survival. Notice that animals, including humans, have offspring which grow into adults	Living things and their habitats: identify and name a variety of plants and animals in their habitats, including micro- habitats	Enquiry Unit - Living things and their habitats
<p>Classifying and sorting materials by their properties e.g., manmade, natural.</p> <p>Investigating and observing what happens to different materials during</p>	<p>Classifying and sorting materials by their properties e.g. manmade, natural.</p> <p>Investigating and observing what happens to different materials during testing and use this to inform</p>	<p>Making close observations of seeds and bulbs.</p> <p>Classifying seeds and bulbs.</p> <p>Researching and plan when and how to plant a range of seeds and bulbs.</p>	<p>Asking questions and use secondary sources to find out about the life cycles of some animals</p> <p>Observing animals growing over a period of time e.g., chicks, caterpillars, a baby</p>	<p>Exploring the outside environment regularly to find objects that are living, dead and have never lived</p> <p>Classify objects found in the local environment.</p> <p>Observing animals and plants carefully, drawing and labelling diagrams.</p> <p>Creating simple food chains for a familiar local habitat from first hand observation and research.</p>	

<p>testing and use this to inform explanation of their properties. Investigating which materials are fit for a purpose e.g. What is the best material for an umbrella?</p> <p>Observing and explaining how materials change when a force is exerted on them by squashing, bending, twisting and stretching. Investigating the transparency of objects, recording class data in a table and drawing simple conclusions from the findings. Asking and answering questions about everyday materials.</p>	<p>explanation of their properties. Investigating which materials are fit for a purpose e.g. What is the best material for an umbrella?</p> <p>Observing and explaining how materials change when a force is exerted on them by squashing, bending, twisting and stretching. Investigating the transparency of objects, recording class data in a table and drawing simple conclusions from the findings. Asking and answering questions about everyday materials.</p>	<p>Looking after the plants as they grow – weeding, thinning, watering etc.</p> <p>Making close observations and measurements of their plants growing from seeds and bulbs. Making comparisons between plants as they grow. Identifying and explaining the similarities and difference between bulbs and seeds.</p>	<p>Asking questions to a parent about how they look after their baby</p> <p>Asking pet owners questions about how they look after their pet</p>	<p>Creating simple food chains from information given e.g. in picture books (Gruffalo etc.).</p> <p>Sorting into living, dead and never lived.</p> <p>Explaining key features that mean the animal or plant is suited to its micro-habitat.</p> <p>Using a food chain to explain what animals eat.</p> <p>Can explain in simple terms why an animal or plant is suited to a habitat</p>
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Key Stage 1 End Points

Asks simple questions and recognises that they can be answered in different ways.	Performs simple tests.	Can identify and classify.	Uses their observations and ideas to suggest answers to questions.	Gathers and records data to help in answering questions.	Observes closely, using simple equipment.
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Year 3

Autumn	Spring	Summer
<p>Plants: investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>Rocks: compare and group together different kinds of rocks on the basis of their properties. Describe in simple terms how fossils are formed</p>	<p>Light: recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces and recognise how shadows are formed</p>
<p>Enquiry Unit – plants</p>	<p>Animals including humans: identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Forces & Magnets: compare how things move on different surfaces. Observe how magnets attract or repel each other and attract some materials and not others.</p>
<p>Observing what happens to plants over time when the leaves or roots are removed.</p> <p>Observing the effect of putting cut white carnations or celery in coloured water.</p> <p>Investigating what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.</p> <p>Finding flowers, seeds, berries and fruits outside throughout the year.</p> <p>Observing flowers carefully to identify the pollen. Observing flowers being visited by pollinators e.g. bees and butterflies in the summer.</p> <p>Observing seeds being blown from the trees e.g. sycamore seeds.</p> <p>Researching different types of seed dispersal.</p> <p>Classifying seeds in a range of ways including by how they are dispersed.</p> <p>Creating a new species of flowering plant.</p> <p>Explaining observations made during investigations.</p> <p>Looking at the features of seeds to decide on their method of dispersal.</p> <p>Drawing and labelling a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal.</p>	<p>Comparing and grouping different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Devising tests to explore the properties of rocks and use data to rank the rocks.</p> <p>Linking the changes of rocks over time with their properties e.g. soft rocks get worn away more easily.</p> <p>Presenting, in different ways, understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc.</p> <p>Identifying plant/animal matter and rocks in samples of soil.</p> <p>Devising a test to explore the water retention of soils.</p>	<p>Observing and identifying changes to the size and orientation of shadows, relative to their proximity to the light source.</p> <p>Observing and identifying the difference in shadows of opaque, translucent and transparent objects/materials.</p> <p>Observing how shadows are formed and affected by different circumstances.</p> <p>Relating the knowledge that light can be reflected off surfaces to investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light.</p> <p>Investigating the size of shadows according to times of day and year, by tracing shadows outside and</p>
<p>Recording and reporting on findings from investigations, involving how things move on different surfaces.</p> <p>Comparing and grouping materials following magnetic testing, recording findings and using the outcome to answer questions about which materials are magnetic.</p> <p>Making and investigating predictions on whether two magnets will attract or repel, depending on which poles are facing.</p>	<p>Classifying food in a range of ways</p> <p>Using food labels to explore the nutritional content of a range of food items.</p> <p>Using secondary sources to find out the types of food that contain different nutrients.</p> <p>Using food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Planning a daily diet which contains a good balance of nutrients and record and presenting findings.</p> <p>Exploring the nutrients contained in fast food.</p> <p>Using secondary sources to research the parts and functions of the skeleton. Investigating pattern seeking questions such as ; Can people with longer legs run faster?;</p>	<p>Observing and identifying changes to the size and orientation of shadows, relative to their proximity to the light source.</p> <p>Observing and identifying the difference in shadows of opaque, translucent and transparent objects/materials.</p> <p>Observing how shadows are formed and affected by different circumstances.</p> <p>Relating the knowledge that light can be reflected off surfaces to investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light.</p> <p>Investigating the size of shadows according to times of day and year, by tracing shadows outside and</p>

		Can people with bigger hands catch a ball better? Comparing, classifying the skeletons of different animals.	comparing differences. Classifying materials according to opaque, transparent and translucent Using oral and written explanations to report on why shadows are formed and how the length and size of a shadow can be changed. Investigating questions related to an object and the shadow it will cause	
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Year 4

Autumn		Spring		Summer	
States of Matter: compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials can change state.	Enquiry Unit - states of Matter	Animals including humans: describe the simple functions of the basic parts of the digestive system in humans. Identifying the different types of teeth in humans and their simple functions.	Living things and their habitats: recognise that environments can change and that this can sometimes pose dangers to living things.	Sound: identify how sounds are made, recognising that vibrations from sounds travel through a medium to the ear.	Electricity: construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
<p>Observing closely and classifying a range of solids and liquids.</p> <p>Exploring making gases visible Classifying materials according to whether they are solids, liquids and gases.</p> <p>Observing a range of materials melting.</p> <p>Investigating how to melt ice more quickly.</p> <p>Observing the changes that are non- reversible relating (common ingredients).</p> <p>Investigating melting point of different materials.</p> <p>Exploring freezing different liquids. Observing and measuring temperature of icy water, tap water, hot water. Observing water evaporating and condensing.</p> <p>Setting up investigations to explore the changing the rate of evaporation.*</p> <p>Using secondary sources to find out about the water cycle.*</p> <p>Using their data to explain what affects how quickly a solid melts.</p> <p>From their data, explaining how to speed up or slow down evaporation.</p> <p>Presenting learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet.</p>		<p>Constructing and interpreting a variety of food chains, identifying producers, predators and prey.</p> <p>Creating food chains based on research.</p> <p>Identifying differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore.</p> <p>Recording the teeth in their mouth (making a dental record).</p> <p>Recreating the human stomach and observe representation of how food breaks down.</p> <p>Labelling the different parts of the digestive system.</p>	<p>Observing plants and animals in different habitats throughout the year and using recordings to compare and contrast the living things observed.</p> <p>Exploring and using classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Classifying living things found in different habitats based on their features.</p> <p>Creating a simple identification key based on observable features.</p> <p>Using research to explore human impact on the local environment e.g. litter, tree planting. *</p> <p>Using secondary sources to find out about how environments may naturally change. *</p> <p>Using secondary sources to find out about human impact, both positive and negative, on environments and write a report on this. *</p>	<p>Experimenting with at least three different instruments to observe and explore volume and pitch.</p> <p>Making predictions and drawing conclusions about the pitch and volume of sounds. *</p> <p>Noting how vibrations make sounds of different volumes and travel to our ears.</p> <p>Identifying and showing how sound travels through particles and into the ear.</p> <p>Making own instruments that produce a range of pitches.</p>	<p>Constructing and investigating a range of circuits.</p> <p>Investigating which materials can be used instead of wires to make a circuit.</p> <p>Classifying materials that conduct electricity and those that don't following investigation and record findings.</p> <p>Investigating the effect of a switch and combinations of switches in simple circuits. Investigating switches and considering variations for specific uses, such as a pressure switch for a burglar alarm.</p> <p>Applying knowledge of conductors and insulators to design and make different types of switch.</p>

Lower Key Stage 2 End Points

Asks relevant questions and use different types of scientific enquiries to answer them.	Sets up simple practical enquiries, comparative and fair tests.	Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Gathers, records, classifies and presents data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Uses results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Identifies differences, similarities or changes related to simple scientific ideas and processes.	Use straightforward scientific evidence to answer questions or to support their findings
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Year 5					
Autumn		Spring		Summer	
Animals including humans: describe the changes as humans develop to old age.	Living things and their habitats: describe the life process of reproduction in some plants and animals.	Earth and Space: describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	Forces: explain the force of gravity. Identify the effects of air resistance, water resistance and friction that act between moving surfaces.	Properties and changes of materials: use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	Enquiry Unit - properties and changes of materials
Comparing and contrasting the life cycles of different living things and presenting findings. Using data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Looking for patterns between the size of an animal and its expected life span).	Growing and observing plants that reproduce asexually e.g. strawberries, spider plant, potatoes. Organising mammals into different groups - sea and land and marsupials and using scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). Drawing and labelling appropriate scientific diagrams following use of secondary sources and first-hand observations relating to the life cycle of a range of animals. Comparing and contrasting the life cycles of different living things and presenting findings. Identifying which insects complete which type of metamorphosis and presenting findings. Identifying the key differences between some amphibians – for example, toads and frogs, and presenting findings in different forms. Using data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Looking for patterns between the size of an animal and its expected life span).	Using secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. Using secondary sources to help make a model to show why day and night occur. Making first-hand observations of how shadows caused by the Sun change through the day. Making a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. Researching time zones. Considering the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.	Investigating the pull on different objects using a newton meter and record forces in Newtons (N). Reporting on conclusions relating to an object's mass and its weight in Newtons. Investigating the effect of friction in a range of contexts. Investigating the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. Investigating the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. Exploring how levers, pulleys and gears work. Researching how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	Investigating the properties of different materials in order to recommend materials for particular functions, depending on these properties e.g. testing waterproofness and thermal insulation to identify a suitable fabric for a coat. Exploring the effect of adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. Investigating rates of dissolving by carrying out comparative and fair test and records findings. Separating mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. Exploring a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. Carrying out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? Researching new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).	
Year 6					
Autumn		Spring		Summer	
Light: 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	Electricity: for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches	Living things and their habitats: describe how living things are classified based on similarities and differences, including micro-organisms, plants and animals.	Evolution and inheritance: recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	Animals including humans: identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	Enquiry Unit/PHS transition unit.
Planning and conducting a test to investigate how light travels and explaining/presenting the findings.	Drawing circuit diagrams of a range of simple series circuits, using recognised symbols.	Classifying plants and animals and record conclusions from the use of classification keys.	Following lines of enquiry to support Explanation of the process of evolution.	Planning and conducting a scientific enquiry to identify different food groups.	

<p>Investigating the use of mirrors to reflect light and record using straight line diagrams to indicating the direction of light. Using mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. Measuring and recording the angle of incidence and angle of reflection using a protractor and detailed diagram.</p>	<p>Communicating structures of circuits using circuit diagrams with recognised symbols Making electric circuits and demonstrating, following investigation, how variation in the working of particular components can be changed. Planning and selecting resources for a fair scientific enquiry, deciding which variables to control. Recording results from an experiment using tables and graphs Evaluating and explaining investigations, results and conclusions.</p>	<p>Using information about the characteristics of an unknown animal or plant to assign it to a group. Using secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. Researching an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system.</p>	<p>Demonstrating an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth. Identifying characteristics that will make a plant or animal suited or not suited to a particular habitat. Comparing the ideas of Charles Darwin and Alfred Wallace on evolution. Researching the work of Mary Anning and understanding how this provided evidence of evolution. Referring to and using examples of fossil evidence that support the theory of evolution.</p>	<p>Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. Using information to identify the main components of the heart. Predicting what will happen to the heart during exercise. Constructing and analysing the variables that make a fair test. Conducting a fair investigation on the effects of exercise on the heart. Using scientific equipment to track results and record data using tables and graphs. ** Analysing whole class data after investigation to compare and reflect on findings and draw conclusions. Using information acquired to write a scientific report on how the human circulatory system works.</p>	
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Upper Key Stage 2 End Points

<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>	<p>Sets up simple practical enquiries, comparative and fair tests.</p>	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>	<p>Using test results to make predictions to set up further comparative and fair tests</p>	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments</p>
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