



## Westfield Primary School- Science Skills Progression

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

### **Pupils should be taught:**

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

	Reception	Year 1	Year 2
<b>Topics Studied</b>	<p><b>Understanding the world</b>  <b>People and communities:</b>            children talk about past and present events in their own lives and in the lives of family members. They know that other children don't always enjoy the same things, and are sensitive to this. They know about similarities and differences between themselves and others, and among families, communities and traditions.</p> <p><b>The world:</b> children know about</p>	<p><b>Science Enquiry Skills</b>  <b>Seasonal Changes</b>  <b>Plants</b>  <b>Animals Inc. humans</b>  <b>Everyday materials</b></p>	<p><b>Science Enquiry Skills</b>  <b>Uses of everyday materials</b>  <b>Plants</b>  <b>Animals Inc. humans</b>  <b>Living things and their habitats</b></p>



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	<p>similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.</p> <p><b>Technology:</b> children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.</p>		
<b>Working Scientifically Questioning</b>		Ask questions about what they immediately observe in their environment. Watch something happen and question how or why it happened.	Begin to ask questions about the wider world and not just what they can immediately see. Begin to develop their own questions on a topic and consider ways they could find out how to answer it.
<b>Working Scientifically Observing and using equipment</b>		Observe something that changes over time e.g. a plant. Use magnifying glasses or hand-lenses to look at objects closely.	Use hand-lenses, magnifying glasses, thermometers and egg-timers in simple practical sessions. Notice changes in temperature, shape, colour, consistency and when there is no change at all.
<b>Working Scientifically Performing simple tests</b>		Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket?...for curtains? ...for a bookshelf? Manipulating	Begin to understand what a fair test is and how to do one correctly. Begin to do more than one test to compare results e.g. plant in the dark and plant in the light to



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		materials and recording what they notice. Observing a plant over a period of time and recording results.	compare requirements for a plant. Begin to conduct tests that show properties of objects e.g. materials, and consider how they affect the purpose of the object – e.g. metal is firm, doesn't bend and is waterproof that's why it's used on cars and buildings.
<b>Working Scientifically Identifying and Classifying</b>		Using simple observations to classify and compare objects e.g. different materials into smooth or hard. Grouping items with one or two simple categories e.g. animals by what they eat.	Begin to compare and classify objects that are not commonly known to them e.g. animals from a farm with animals from the beach. Grouping and classifying with several categories and be able to explain choices.
<b>Working Scientifically Suggesting answers to questions using observations</b>		Begin to make simple connections from data to scientific questions e.g. What has happened to the leaves on the tree? They have turned brown and died because it is Autumn.	Begin to notice patterns and relationships from more complex data. E.g. The material could be squashed but can't return to the shape it was before. But another material can be squashed and it bounces back into its original shape, that material is more flexible or less firm than the other.
<b>Working Scientifically Gathering and Recording Data</b>		Draw and label simple diagrams e.g. parts of a plant. Keep a record of something that changes over time e.g. as a flower bud opens. Complete simple tables or charts e.g. about the weather.	Record information using tables, explanation sentences, food chains, charts, simple graphs and labelled diagrams. They should (with help) be able to explain what they have found out and use simple scientific language when explaining their recorded



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			data.
<b>Plants</b>		<ul style="list-style-type: none"><li>• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li><li>• Identify and describe the basic structure of a variety of common flowering plants, including trees.</li></ul>	<ul style="list-style-type: none"><li>• observe and describe how seeds and bulbs grow into mature plants</li><li>• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li></ul>
<b>Animals including humans</b>		<ul style="list-style-type: none"><li>• identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li><li>• identify and name a variety of common animals that are carnivores, herbivores and omnivores</li><li>• describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</li><li>• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li></ul>	<ul style="list-style-type: none"><li>• notice that animals, including humans, have offspring which grow into adults</li><li>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li><li>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li></ul>



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<b>Everyday materials</b>		<ul style="list-style-type: none"><li>• distinguish between an object and the material from which it is made</li><li>• identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li><li>• describe the simple physical properties of a variety of everyday materials</li><li>• compare and group together a variety of everyday materials on the basis of their simple physical properties.</li></ul>	<ul style="list-style-type: none"><li>• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li><li>• find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li></ul>
<b>Seasonal Changes</b>		<ul style="list-style-type: none"><li>• observe changes across the four seasons</li><li>• observe and describe weather associated with the seasons and how day length varies.</li></ul>	
<b>Living things and their habitats</b>			<ul style="list-style-type: none"><li>• explore and compare the differences between things that are living, dead, and things that have never been alive</li><li>• 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</li></ul>



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			<p>animals and plants, and how they depend on each other</p> <ul style="list-style-type: none"> <li>• identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• 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.</li> </ul>
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	Year 3	Year 4	Year 5	Year 6
Topics Studied	<b>Scientific Enquiry Skills</b> <b>Forces and Magnets</b> <b>Light</b> <b>Plants</b> <b>Animals Inc. humans (nutrition and skeleton)</b> <b>Rocks and Soils</b>	<b>Scientific Enquiry Skills</b> <b>Sound</b> <b>Electricity</b> <b>States of Matter</b> <b>Animals Inc. humans (digestive system, teeth &amp; food chains)</b> <b>Living things and their habitats</b>	<b>Scientific Enquiry Skills</b> <b>Animals Inc. humans (ageing)</b> <b>Living things and their habitats</b> <b>Forces</b> <b>Earth and Space</b> <b>Properties of materials</b>	<b>Scientific Enquiry Skills</b> <b>Electricity</b> <b>Animals Inc. humans (circulatory, health, transportation in body)</b> <b>Living things and their habitats</b> <b>Evolution and Inheritance</b> <b>Light</b>
Working Scientifically Questioning	Begin to ask own relevant questions that can be answered with a simple scientific enquiry.	Ask own questions relevant to the topic that can be answered with a range of scientific enquiries. Suggest own enquiries to answer the	Questions develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking	Questions develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific



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		questions.	their own questions about scientific phenomena; encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.	phenomena; encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time.
<b>Working Scientifically Observing and using equipment</b>	Begin to make systematic and careful observations. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses.	Make systematic and careful observations. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses. Deciding when a fair test is necessary and help decide how to set it up. Begin to recognise when secondary sources are needed to answer questions.	To grow more confident at taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. Taking accurate measurements using standard units	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses



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			using thermometers, data loggers, cylinders, timers and magnifying glasses	
<b>Working Scientifically Performing simple tests</b>	Begin to independently set up practical enquiries, comparative and fair tests.	Independently set up and complete practical enquiries, comparative and fair tests. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions and recognise when a simple fair test is necessary and help to decide how to set it up.	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They need to be able to justify their choice of experiment.	select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately.
<b>Working Scientifically Identifying and Classifying</b>	Compare and group items form a variety of categories. Begin to explain choices using scientific vocabulary to justify choices.	Compare and group items form a variety of categories. To explain choices using scientific vocabulary to justify choices. Talk about criteria for grouping, sorting and classifying; and use simple keys.	Suggest categories from grouping and classifying. Noticing patterns, grouping and classifying things. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify	Suggest categories from grouping and classifying. Noticing patterns, grouping and classifying things. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. Use Venn





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			patterns that might be found in the natural environment.	diagrams with two or more circles to classify more complex information. Look for patterns, similarities and differences between items with interest.
<b>Working Scientifically Suggesting answers to questions using observations</b>	Begin to use scientific vocabulary more confidently when explaining results and drawing conclusions.	To use scientific vocabulary more confidently when explaining results and drawing conclusions. To relate findings back to the original question and consider what to do as a next step.	Identifying scientific evidence that has been used to support or refute ideas or arguments. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. They should be able to evaluate the effectiveness of the test done and consider next steps in the investigation.	Identifying scientific evidence that can support or refute ideas or arguments. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. They should be able to evaluate the effectiveness of the test done and consider next steps in the investigation. Draw comparisons with other's results and consider how the variables may have affected results and therefore the answer to their scientific question.
<b>Working Scientifically Gathering and Recording Data</b>	Collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to	Collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They



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	record and analyse this data.	how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
<b>Animals Inc. humans</b>	<ul style="list-style-type: none"> <li>identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make</li> </ul>	<ul style="list-style-type: none"> <li>describe the simple functions of the basic parts of the digestive system in humans</li> </ul>	<ul style="list-style-type: none"> <li>describe the changes as humans develop to old age.</li> </ul>	<ul style="list-style-type: none"> <li>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>recognise the impact of</li> </ul>



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	<p>their own food; they get nutrition from what they eat</p> <ul style="list-style-type: none"><li>• identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li></ul>	<ul style="list-style-type: none"><li>• identify the different types of teeth in humans and their simple functions</li><li>• construct and interpret a variety of food chains, identifying producers, predators and prey.</li></ul>		<p>diet, exercise, drugs and lifestyle on the way their bodies function</p> <ul style="list-style-type: none"><li>• describe the ways in which nutrients and water are transported within animals, including humans.</li></ul>
<b>Light</b>	<ul style="list-style-type: none"><li>• recognise that they need light in order to see things and that dark is the absence of light</li><li>• notice that light is reflected from surfaces</li><li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li><li>• recognise that shadows are formed when the light from a light</li></ul>			<ul style="list-style-type: none"><li>• recognise that light appears to travel in straight lines</li><li>• 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</li><li>• 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</li><li>• use the idea that light travels in straight lines</li></ul>



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	<p>source is blocked by an opaque object</p> <ul style="list-style-type: none"><li>• find patterns in the way that the size of shadows change.</li></ul>			<p>to explain why shadows have the same shape as the objects that cast them.</p>
<b>Electricity</b>		<ul style="list-style-type: none"><li>• identify common appliances that run on electricity</li><li>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li><li>• 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</li><li>• recognise that a switch opens and closes a</li></ul>		<ul style="list-style-type: none"><li>• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li><li>• 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</li><li>• use recognised symbols when representing a simple circuit in a diagram.</li></ul>



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		<p>circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <ul style="list-style-type: none"><li>• recognise some common conductors and insulators, and associate metals with being good conductors.</li></ul>		
<b>Plants</b>	<ul style="list-style-type: none"><li>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li><li>• explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li><li>• investigate the way in which water</li></ul>			



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	<p>is transported within plants</p> <ul style="list-style-type: none"><li>• explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li></ul>			
<b>Forces and magnets</b>	<ul style="list-style-type: none"><li>• compare how things move on different surfaces</li><li>• notice that some forces need contact between two objects, but magnetic forces can act at a distance</li><li>• observe how magnets attract or repel each other and attract some materials and not others</li><li>• compare and group together a variety of everyday materials on the basis of whether they are attracted</li></ul>			



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	<p>to a magnet, and identify some magnetic materials</p> <ul style="list-style-type: none"><li>• describe magnets as having two poles</li><li>• predict whether two magnets will attract or repel each other, depending on which poles are facing.</li></ul>			
<b>Changing materials</b>			<ul style="list-style-type: none"><li>• 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</li><li>• know that some materials will dissolve in liquid to form a solution, and describe how</li></ul>	



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			<p>to recover a substance from a solution</p> <ul style="list-style-type: none"><li>• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li><li>• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li><li>• demonstrate that dissolving, mixing and changes of state are reversible changes</li><li>• explain that some changes result in the formation of new materials, and that this kind of change is not</li></ul>	
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			usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
<b>Living things and their habitats</b>		<ul style="list-style-type: none"><li>• recognise that living things can be grouped in a variety of ways</li><li>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li><li>• recognise that environments can change and that this can sometimes pose dangers to living things.</li></ul>	<ul style="list-style-type: none"><li>• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li><li>• describe the life process of reproduction in some plants and animals.</li></ul>	<ul style="list-style-type: none"><li>• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals</li><li>• give reasons for classifying plants and animals based on specific characteristics</li></ul>
<b>Sound</b>		<ul style="list-style-type: none"><li>• identify how sounds are made, associating some of them</li></ul>		



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		<p>with something vibrating</p> <ul style="list-style-type: none"><li>• recognise that vibrations from sounds travel through a medium to the ear</li><li>• find patterns between the pitch of a sound and features of the object that produced it</li><li>• find patterns between the volume of a sound and the strength of the vibrations that produced it</li><li>• recognise that sounds get fainter as the distance from the sound source increases.</li></ul>		
<b>States of matter</b>		<ul style="list-style-type: none"><li>• compare and group materials together, according to</li></ul>		



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		<p>whether they are solids, liquids or gases</p> <ul style="list-style-type: none"><li>• observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</li><li>• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li></ul>		
<b>Rocks and Soils</b>	<ul style="list-style-type: none"><li>• compare and group together different kinds of rocks on the basis of their appearance and simple physical</li></ul>			



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	<p>properties</p> <ul style="list-style-type: none"><li>• describe in simple terms how fossils are formed when things that have lived are trapped within rock</li><li>• recognise that soils are made from rocks and organic matter.</li></ul>			
<b>Earth and Space</b>			<ul style="list-style-type: none"><li>• describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li><li>• describe the movement of the Moon relative to the Earth</li><li>• describe the Sun, Earth and Moon as approximately spherical bodies</li><li>• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the</li></ul>	



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<b>Forces</b>			sky. <ul style="list-style-type: none"><li>• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li><li>• identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li><li>• recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li></ul>	
<b>Evolution and Inheritance</b>				<ul style="list-style-type: none"><li>• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li></ul>



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				<ul style="list-style-type: none"><li>• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li><li>• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li></ul>
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