

## Progression Map for Science

### Purpose of study

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.

### Aims

The national curriculum for science aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- 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
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

		WORKING SCIENTIFICALLY			
		Observing	Testing	Identifying and classifying	Recording and evaluating
EYFS	N	Engage in extended conversations (DM L 3-4)	- Explore how things work (DM UW 3-4)	- Use a wider range of vocabulary. (DM CL 3-4) - Understand a question (DM CL 3-4)	- Understand the five key concepts about print: - print has meaning - print can have different purposes
	R	Use and understand recently introduced vocabulary during discussions <b>ELG L8c</b> - Use new vocabulary through the day. (DM CL rec) - Ask questions to find out more and to check they understand what has been said to them. (DM CL Rec)	-Make comments about what they have heard and ask questions to clarify their understanding (ELG CL 1c) Use a range of small tools, (ELG PD 7b)	- Use talk to help work out problems and organise thinking and activities explain how things work and why they might happen. (DM CL rec)	Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary (ELG CL 2a) Connect one idea or action to another using a range of connectives. - Describe events in some detail. (DM CL rec)
KS1	Y1	<b>-Asking simple questions and recognising that they can be answered in different ways</b> <b>-Observing closely, using simple equipment</b> -talk about what they see, touch, smell, hear or taste.	<b>-Performing simple tests</b> - tell other people about what they have done.	<b>-Identifying and classifying things they observe.</b> -think of some questions to ask. -answer some scientific questions. -give a simple reason for their answers. -explain what they have found out.	<b>-Using their observations and ideas to suggest answers to questions</b> <b>- Gathering and recording data to help in answering questions.</b> -show their work using pictures, labels and captions. -record their finding using standard units. -put some information in a chart or table.
	Y2	<b>-Asking simple questions and recognising that they can be answered in different ways</b> <b>-Observing closely, using simple equipment</b> -use senses <see, touch, smell, hear or taste> to help them answer questions. -use some scientific words to describe what they have seen -compare several things.	<b>-Performing simple fair tests</b> -explain why it might not be fair to compare two things. -say whether things happened as they expected. -suggest how to find things out. -use prompts to find things out.	<b>-Identifying and classifying</b> -organise things into groups. -find simple patterns (or associations). -identify animals and plants by a specific criteria, e.g. lay eggs or not; have feathers or not.	<b>-Using their observations and ideas to suggest answers to questions</b> <b>- Gathering and recording data to help in answering questions.</b> -use (text, diagrams, pictures, charts, tables) to record their observations. -measure using simple equipment.

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WORKING SCIENTIFICALLY					
		Observing	Testing	Identifying and classifying	Recording and evaluating
LKS2	Y3	-Asking relevant questions and using different types of scientific enquiries to answer them -Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	-Setting up simple practical enquiries, comparative and fair tests	-Gathering, recording, classifying and presenting 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 -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions -Identifying differences, similarities or changes related to simple scientific ideas and processes - Using straightforward scientific evidence to answer questions or to support their findings.
	Y4	-Asking relevant questions and using different types of scientific enquiries to answer them -Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	-Setting up simple practical enquiries, comparative and fair tests	-Gathering, recording, classifying and presenting 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 -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions -Identifying differences, similarities or changes related to simple scientific ideas and processes - Using straightforward scientific evidence to answer questions or to support their findings.
UKS2	Y5	-Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	-Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate -Using test results to make predictions to set up further comparative and fair tests Reporting and presenting	-Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	-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 -Identifying scientific evidence that has been used to support or refute ideas or arguments.
	Y6	-Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	-Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate -Using test results to make predictions to set up further comparative and fair tests Reporting and presenting	-Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	-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 -Identifying scientific evidence that has been used to support or refute ideas or arguments.

		LIFE PROCESSES AND LIVING THINGS (BIOLOGY)		
		Plants	Animals, including humans	Living things & habitats
EYFS	N	- Plant seeds and care for growing plants. (DM UW 3-4)	-Make healthy choices about food, drink, activity and tooth brushing (DM PSED 3-4)	- Understand the key features of the life cycle of a plant and an animal. (DM UW 3-4) - Begin to understand the need to respect and care for the natural environment and all living things. (DM UW 3-4)
	R	-Explore the natural world around them, making observations and drawing pictures of animals and plants <b>ELG UW 15a</b>	-Explore the natural world around them, making observations and drawing pictures of animals and plants <b>ELG UW 15a</b> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. (ELG PSED 4b) - Know and talk about the different factors that support their overall health and wellbeing (DM PSED REC):regular physical activity, healthy eating, tooth brushing	-Know some similarities and differences between the natural world around them and contrasting environments <b>ELG UW 15b</b> - Explore the natural world around them. (DM UW REC) - Describe what they see, hear and feel whilst outside. (DM UW REC) - Recognise some environments that are different to the one in which they live. (DM UW REC)
KS1	Y1	<b>-Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</b> <b>-Identify and describe the basic structure of a variety of common flowering plants, including trees</b> -name the petals, stem, leaf and root of a plant. -recognise deciduous and evergreen trees. -describe the parts of a plant (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). -sort some plants by size. -sort some animals by body covering, e.g. scales, fur and skin.	<b>-Identify, name and classify a variety of common animals including fish, amphibians, reptiles, birds and mammals invertebrates)</b> <b>-Identify and name a variety of common domestic animals that are carnivores, herbivores and omnivores</b> <b>-describe and compare the structure of a variety of common animals.</b> <b>-Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</b> -point out some of the differences between different animals. -sort photographs of living things and non-living things. --describe how an animal is suited to its environment. -name the parts of the human body that they can see. <b>(including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth)</b> -name the parts of an animal's body and compare their bodies to different animals.	
	Y2	<b>-Observe and describe how seeds and bulbs grow into mature plants</b> <b>-Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</b> -describe what plants need to survive. --describe what a plant needs to grow and stay healthy. -explain that plants grow and reproduce.	<b>-Notice that animals, including humans, have offspring which grow into adults</b> <b>-Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</b> <b>-Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</b> -explain that animals grow and reproduce. -describe the life cycle of some living things. (e.g. egg, chick, chicken) -describe why exercise and a balanced diet are important for humans.	<b>-Explore and compare the differences between things that are living, dead, and things that have never been alive</b> <b>-Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</b> <b>-Identify and name a variety of plants and animals in their habitats, including micro-habitats</b> <b>-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.</b> --describe some of the life processes common to plants and animals, including humans. -decide whether something is living, dead or non-living. -describe how a habitat provides for the basic needs of things living there. -compare how plants grow in different conditions by making measurements. -collect weather data about a local habitat and use it to explain the plants and animals they will find there.

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## LIFE PROCESSES AND LIVING THINGS (BIOLOGY)

		Plants	Animals, including humans	Living things & habitats	Evolution and inheritance
LKS2	Y3	<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 is transported within plants</li> <li>-Explore the part that flowers play in the life cycle</li> </ul>	<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 their own food; they get nutrition from what they eat</li> <li>-Identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> </ul>		
	Y4		<ul style="list-style-type: none"> <li>-Describe the simple functions of the basic parts of the digestive system in humans</li> <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>	<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>	
UKS2	Y5		<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>-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>	
	Y6		<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 diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans</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 micro-organisms, plants and animals</li> <li>-Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<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> <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>

## MATERIALS AND THEIR PROPERTIES (CHEMISTRY)

		Everyday Materials	Properties & Changes of Materials	States of Matter
EYFS	N	<ul style="list-style-type: none"> <li>- Use all their senses in hands on exploration of natural materials. (DM UW 3-4)</li> <li>- Explore and talk about different forces they can feel. (DM UW 3-4)</li> </ul>	<ul style="list-style-type: none"> <li>- Talk about the differences between materials and changes they notice. (DM UW 3-4)</li> <li>- Use all their senses in hands on exploration of natural materials</li> <li>- Explore collections of materials with similar and/or different properties.</li> </ul>	Talk about what they see, using a wide vocabulary.
	R	<ul style="list-style-type: none"> <li>- Describe what they see, hear and feel whilst outside.</li> </ul>	<ul style="list-style-type: none"> <li>Explore the natural world around them.</li> <li>- Describe what they see, hear and feel whilst outside.</li> </ul>	<ul style="list-style-type: none"> <li>-Understand some important processes and changes in the natural world around them, including changing states of matter. <b>ELG UW 15b</b></li> <li>- Recognise some similarities and differences</li> </ul>
KS1	Y1	<ul style="list-style-type: none"> <li><b>-Distinguish between an object and the material from which it is made</b></li> <li><b>-Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</b></li> <li><b>-Describe the simple physical properties of a variety of everyday materials</b></li> <li><b>-Compare and group together a variety of everyday materials on the basis of their simple physical properties.</b></li> <li>-describe materials using their senses using specific scientific words.</li> <li><b>hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</b></li> <li>-explain what material objects are made from.</li> <li>-explain why a material might be useful for a specific job.</li> </ul>	<ul style="list-style-type: none"> <li><b>Classifying and grouping materials</b></li> <li>-distinguish between an object and the material from which it is made.</li> <li>-identify and name a range of everyday materials. (wood, plastic, metal, water, rock)</li> <li>-describe the simple physical properties of a variety of everyday materials.</li> <li>-compare and classify a variety of materials based on their simple physical properties.</li> </ul>	
	Y2	<ul style="list-style-type: none"> <li><b>- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</b></li> <li><b>- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</b></li> <li>-find out about people who developed useful new materials. (Dunlop, MacKintosh, MacAdam)</li> <li>- identify and compare the uses of a range of everyday materials. (wood, metal, plastic, glass, brick/rock, paper/cardboard)</li> <li>-explain how things move on different surfaces.</li> </ul>	<ul style="list-style-type: none"> <li><b>Classifying and grouping materials</b></li> <li>-distinguish between an object and the material from which it is made.</li> <li>-identify and name a range of everyday materials. (wood, metal, plastic, glass, brick, rock, paper)</li> <li>-describe the simple physical properties of a variety of everyday materials.</li> <li>-compare and classify a variety of materials based on their simple physical properties.</li> </ul>	

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## MATERIALS AND THEIR PROPERTIES (CHEMISTRY)

		Rocks	Properties & Changes of Materials	States of Matter
LKS2	Y3	<ul style="list-style-type: none"> <li>- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <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>		
	Y4			<ul style="list-style-type: none"> <li>- Compare and group materials together, according to whether they are solids, liquids or gases</li> <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>
UKS2	Y5		<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 to recover a substance from a solution</li> <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 usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</li> </ul>	
	Y6			

## PHYSICAL PROCESSES (PHYSICS)

		Light	Sound	Forces and Magnets	Seasonal Change	Earth and Space	Electricity
EYFS	N	Explore how things work. Talk about what they see, using a wide vocabulary.	Explore how things work. Talk about what they see, using a wide vocabulary.	Explore and talk about different forces they can feel. Talk about what they see, using a wide vocabulary.	Plant seeds and care for growing plants. Explore how things work. Talk about what they see, using a wide vocabulary.	Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.	Explore how things work. Talk about what they see, using a wide vocabulary.
	R	Describe what they see, hear and feel whilst outside. Explore the natural world around them.	Describe what they see, hear and feel whilst outside. Explore the natural world around them.	Describe what they see, hear and feel whilst outside. Explore the natural world around them.	-Understand some important processes and changes in the natural world around them, including the seasons. <b>ELG UW 15b</b> - Understand the effect of changing seasons on the natural world around them. (DM UW REC)		Describe what they see, hear and feel whilst outside.
KSI	Y1	-identify and name the sources of light. -identify and name sources of light that we can see. -explain what darkness is. -compare sources of light. (brightest, dullest, darker, lighter) -observe and describe shadows during the day.		-describe and show how to make something move, e.g. push and pull.	-Observe changes across the four seasons - Observe and describe weather associated with the seasons and how day length varies. making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.	-Do they know that the sun lights up the Earth. -stay safe when observing the sun. -describe how the sun moves across the sky.	
	Y2	-compare the brightness and colour of lights. -explain what dark is; using words like shadow. -explain why their shadow changes during the day.	-describe different ways of making sound. -explain why a sound is louder the closer they are to the source.				-identify everyday appliances which use electricity. -recognise that electricity is an important source of light.

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## PHYSICAL PROCESSES (PHYSICS)

		Light	Sound	Forces and Magnets	Earth and Space	Electricity
LKS2	Y3	<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 source is blocked by a solid object</li> <li>-Find patterns in the way that the size of shadows change.</li> </ul>		<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 to a magnet, and identify some magnetic materials</li> <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>		
	Y4		<ul style="list-style-type: none"> <li>-Identify how sounds are made, associating some of them with something vibrating</li> <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>			<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 circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>-Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>

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## PHYSICAL PROCESSES (PHYSICS)

		Light	Sound	Forces and Magnets	Earth and Space	Electricity
UKS2	Y5			<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>	<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 sky</li> </ul>	
	Y6	<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 to explain why shadows have the same shape as the objects that cast them.</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>