



# *Science Progression*

*(knowledge and skills)*

*(Updated 2023)*

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.

	<i>By the end of Reception</i>	<i>By the end of Year 2</i>	<i>By the end of Year 4</i>	<i>By the end of Year 6</i>
<b>To work scientifically</b>	<p><i>Look closely at similarities, differences, patterns and change</i></p>	<p><i>Ask simple questions</i></p> <p><i>Know how to use simple equipment</i></p> <p><i>Know how to observe closely</i></p> <p><i>Understand how to perform simple tests</i></p> <p><i>Know how to identify and classify</i></p> <p><i>Use observations and ideas to suggest answers to questions</i></p> <p><i>Know how to gather and record data to help answer questions</i></p>	<p><i>Ask relevant questions</i></p> <p><i>To know how to set up simple practical enquiries and comparative and fair tests</i></p> <p><i>To know how to make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.</i></p> <p><i>To know how to gather, record, classify and present data in a variety of ways to help in answering questions.</i></p> <p><i>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.</i></p> <p><i>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</i></p> <p><i>Know how to use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</i></p> <p><i>Knows how to identify differences, similarities or changes related to simple, scientific ideas and processes.</i></p> <p><i>Understands how to use straightforward, scientific evidence to answer questions or to support their findings.</i></p>	<p><i>Plan enquiries, including recognising and controlling variables where necessary.</i></p> <p><i>Knows how to use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.</i></p> <p><i>Knows how to take measurements, using a range of scientific equipment, with increasing accuracy and precision.</i></p> <p><i>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.</i></p> <p><i>Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.</i></p> <p><i>Present findings in written form, displays and other presentations.</i></p> <p><i>Use test results to make predictions to set up further comparative and fair tests.</i></p> <p><i>Know how to use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p>

# 1. Skills progression



SCIENCE		EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
SCIENTIFIC ENQUIRY	<b>QUESTION</b>	Ask simple questions about immediate environment.	Ask questions and know some can be answered using scientific enquiry.		Identify scientific questions. ie can be investigated through scientific enquiry.		Raise scientific questions and hypothesise	
	<b>OBSERVE</b>	Qualitative Talk about similarities and differences.	Qualitative and Simple Quantitative		Qualitative and Quantitative		Qualitative and Quantitative	
			Observe change over time. Use Senses/ equipment.	Measure change over time e.g. plant growth. Select equipment	Systematic/ careful observations. Use bar charts, pictograms, tables.	Accurate measurements. Use time graphs and other graphs.	Accurate/ precise measurements, Diagrams, tables, bar and line graphs.	Take repeat readings when appropriate. Scatter graphs.
	<b>CLASSIFY and FIND PATTERNS</b>	Talk and Sort	Identify and Classify		Classify and Find Patterns		Classify and Find Patterns	
		Use simple scientific criteria.	e.g. familiar plants, animals, materials  Compare and contrast	e.g. living/ dead/ never alive; materials  Compare differences	Classify animals/ materials. Link two variables e.g. <i>the closer the magnet the bigger the force.</i>	Use simple classification keys. Link two variables e.g. <i>the more cells in a circuit, the brighter the bulb.</i>	Use complex classification keys. Identify causal relationships.	Develop classification keys. Identify evidence that supports/ refutes causal relationship.
	<b>CONTROL INVESTIGATIONS: comparative and fair testing</b>	Explore objects/ materials/ living things/ resources designed to model scientific processes.	Simple comparative tests		Comparative and fair tests		Design own comparative and fair tests	
			e.g. <i>What is the best material for an umbrella?</i>	e.g. <i>What if plants do not get light and water?</i>	Predict. Fair tests e.g. <i>How does distance affect magnet strength?</i>	Predict. Language of independent and control variable.	Identify when and how to use tests. Recognise and control variables. Make predictions based on previous test results.	
	<b>RESEARCH</b>	Listen and respond to stories about scientific processes/ events/ objects.	Find information using given sources. e.g. <i>animals.</i>	Select information from a range of given sources.	Research using given sources. e.g. <i>research different food groups and how they keep us healthy</i>	Select information to support findings. e.g. <i>research animals</i>	Explore relevant information by using a wide range of secondary sources.	
Explore how scientific ideas have developed over time.							Identify evidence that has been used to support or refute ideas.	
<b>MODEL</b>	Concrete context.  Create drawings and models of their environment	Concrete context  Draw diagrams e.g. <i>parts of plants/ the body.</i>	Explore and create  drawings and physical models e.g. <i>habitats.</i>	Abstract contexts e.g. processes and phenomena such as forces/ light. Use labelled diagrams and drawings and physical models.	Abstract contexts e.g. processes and phenomena such as sound/ electricity. Create labelled diagrams and drawings and physical models.	Abstract contexts.  Evaluate diagrams/ models e.g. states of matter; solar system.	Abstract contexts.  Create own versions of models. e.g. circulatory system; light.	
<b>CONCLUDE</b>	Explain simple phenomena: How? Why?	Describe what has happened or been observed.	Explain why a simple observation occurred. Evaluate the effectiveness of observations.	Explain an observation or an event in scientific terms. Distinguish between what has been observed and why it happened. Begin to link evidence from secondary sources as well as primary. Suggest improvements.		Evaluate original hypothesis against observed evidence and reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is.		

# Working Scientifically Skills

## Year 1 & 2

### **Asking simple questions and recognising that they can be answered in different ways**

- While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.
- The children answer questions developed with the teacher often through a scenario.
- The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.

### **Observing closely, using simple equipment**

- Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.
- They begin to take measurements, initially by comparisons, then using non-standard units.

### **Performing simple tests**

- The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

### **Identifying and classifying**

- Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.
- They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.

### **Gathering and recording data to help in answering questions**

- The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.
- They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.
- They classify using simple prepared tables and sorting rings.

### **Using their observations and ideas to suggest answers to questions**

- Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.
- The children recognise 'biggest and smallest', 'best and worst' etc. from their data.



# Year 3 & 4

## **Asking relevant questions and using different types of scientific enquiries to answer them**

- The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions
- The children answer questions posed by the teacher.
- Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

## **Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers**

- The children make systematic and careful observations.
- They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

## **Setting up simple practical enquiries, comparative and fair tests**

- The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.
- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking

### **Explanatory note:**

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

## **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**

- The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.
- Children are supported to present the same data in different ways in order to help with answering the question.

## **Using straightforward scientific evidence to answer questions or to support their findings**

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information

**Identifying differences, similarities or changes related to simple scientific ideas and processes**

- Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.

**Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions**

- They draw conclusions based on their evidence and current subject knowledge.
- They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.
- Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.
- Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.

**Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions**

- They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.

# Year 5 & 6

## **Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary**

- Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.
- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
- The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

## **Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate**

- The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.
- During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).

## **Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**

- The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.
- Children present the same data in different ways in order to help with answering the question.

## **Identifying scientific evidence that has been used to support or refute ideas or arguments**

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.
- They talk about how their scientific ideas change due to new evidence that they have gathered.
- They talk about how new discoveries change scientific understanding.



**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**

- In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.
- They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.
- They identify any limitations that reduce the trust they have in their data.
- They communicate their findings to an audience using relevant scientific language and illustrations.

**Using test results to make predictions to set up further comparative and fair tests**

- Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

# *2. Substantive and disciplinary knowledge progression*



Topic	By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
	<p>Children should know about similarities and differences in relation to places, objects, materials and living things.</p> <p>They talk about the features of their own immediate environment and how environments might vary from one another.</p> <p>They make observations of animals and plants and explain why some things occur, and talk about changes.</p>						

- Explore the natural world around them. *Understanding the world*
- Describe what they see, hear and feel whilst outside. *Understanding the world*
- Recognise some environments that are different to the one in which they live. *Understanding the world*
- Understand the effect of changing seasons on the natural world around them. *Understanding the world*
- Make comments about what they have heard and ask questions to clarify their understanding - *ELG*
- Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; Offer explanations for why things might happen - *ELG*
- Explore the natural world around them, making observations and drawing pictures of animals and plants - *ELG*
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class- *ELG*
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter - *ELG*

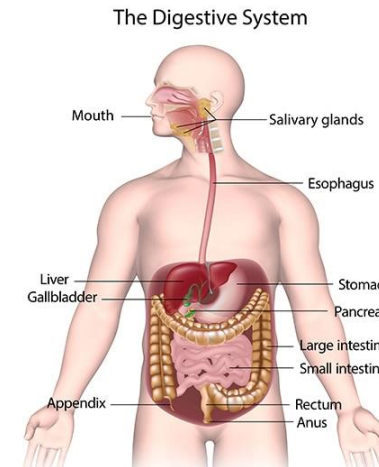
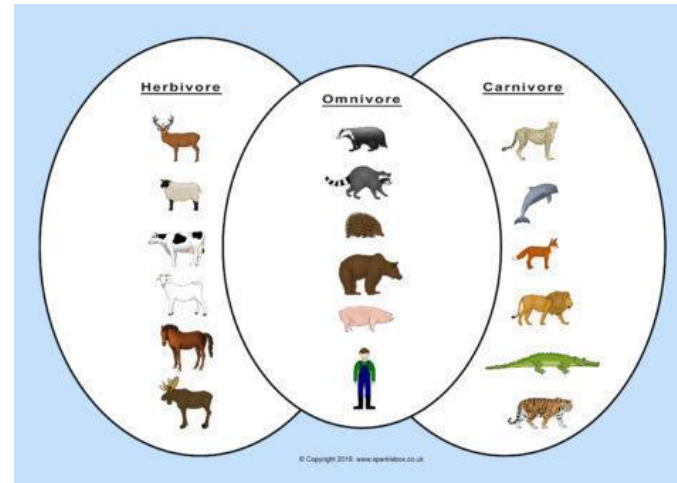
<b>EYFS Investigation Ideas:</b>	<p>Choose resources they are familiar with to complete exploratory tasks around Science knowledge.</p> <p><i>Fair and comparative testing.</i></p>	<p>Make observations of animals and plants as well as their habitats, over the seasons.</p> <p><i>Observing closely</i></p>	<p>Make observations of animals and plants in order to group into own or given simple criteria e.g. farm animal, wild animal, fish, bird.</p> <p><i>Classify and identify</i></p>	<p>Relate information from books or other information shared as a class (narratives, appropriate non-fiction books, Explorify etc).</p> <p><i>Using secondary sources.</i></p>	<p>Observe and discuss patterns of change across the seasons.</p> <p><i>Pattern Seeking</i></p>
----------------------------------	--	---	---	--	---

# Plants



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants (seeds, roots etc), including trees.</p>	<p>To observe and know how seeds and bulbs grow into mature plants.</p> <p>To find out and describe how plants need water, light and suitable temperature to grow and stay healthy.</p>	<p>Identify, know and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>Explore and know 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.</p> <p>Investigate and understand the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>			

# Animals including Humans



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, Including pets).</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>To know that animals, including humans, have offspring which grow into adults.</p> <p>To know and describe the basic needs of animals, including humans, for survival (water, food and air).</p> <p>Know and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p>To identify and know 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.</p> <p>Identify and know that humans and some animals have skeletons and muscles for support, protection and movement.</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>To describe the changes as humans develop to old age.</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>

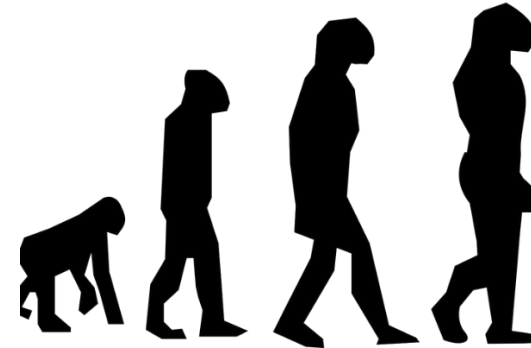


# Living things and their habitats



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
		<p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>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.</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats.</p> <p>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.</p>		<p>Identify and name a variety of living things (plants and animals) in the local and wider.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p> <p>Recognise that environments are constantly changing and that this can sometimes pose dangers to specific habitats.</p>	<p>To know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p>	<p>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.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>

# Evolution and Inheritance



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
						<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>

# Everyday materials



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
	<p>To know how to distinguish between an object and the material from which it is made.</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>To be able to describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials based on their simple physical properties.</p>	<p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Identify and compare and know the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard.</p>		<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (<math>^{\circ}\text{C}</math>), building on their teaching in mathematics.</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p><b>Properties and changes of materials</b></p> <p>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.</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p>	

					<p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>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.</p>	
--	--	--	--	--	---	--

# Rocks



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
			<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soil are made from rocks and organic matter.</p>			



# Seasonal Changes



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
		<p>Observe and talk about changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies, including understanding that it is unsafe to look directly at the Sun.</p>				

# Sound



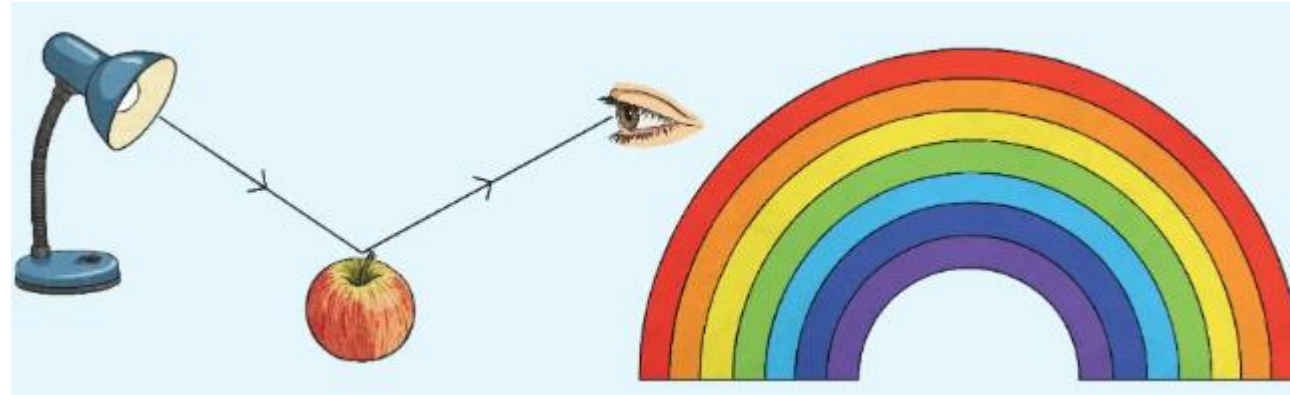
By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
				<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound's source increases.</p>		

# Earth and space



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
					<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar System.</p> <p>Describe the movement of the Moon relative to the Earth.</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.</p>	

# Light



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
			<p>Recognise that they need light in order to see things and that dark is absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect the eyes.</p> <p>Recognise that shadows are formed when light from a light source is blocked by a solid object.</p> <p>Find patterns in the way that the size of shadows change.</p>			<p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>

# Electricity



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
				<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators and associate metals with being good conductors.</p>		<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>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.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>



# Forces and magnets



By the end of EYFS	By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
			<p>Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>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.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	

# 3. *Working Scientifically* *Progression*



# Working Scientifically progression EYFS – Year 6

Key:

*Progression in red text relates to asking questions.*

*Progression in blue text relates to observing and taking measurements.*

*Progression in green text relates to setting up and carrying out investigations.*

*Progression in grey text relates to gathering and presenting data.*

*Progression in purple text relates to using results and evidence.*

**Note:** Children should use all 5 types of enquiry:

**Fair test** – keep all variables the same other than the one you are investigating

**Identifying and classifying** – increase understanding by finding common traits and placing things into groups

**Pattern seeking** – collect data from experiments or surveys and looks for patterns which can be used to draw conclusions

**Research** – using secondary sources (this may be used to back up findings)

**Observation over time** – observe what happens over time

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.

A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

EYFS

- Children explain their own knowledge and understanding and ask appropriate questions of others (40-60 months – PSED– Making relationships)
- Children answer how and why questions about their experiences (ELG – Communication and Language – understanding)
- Children have their own ideas (CoL Creating and thinking critically)
- Use talk to help work out problems & organise thinking & activities & to explain how things work & why they might happen. (DM – C&L – Reception)
- Ask questions to find out more and to check they understand what has been said to them. (DM – C&L – Reception)
- Make comments about what they have heard and ask questions to clarify their understanding. (DM – C&L – ELG)
- Children look closely at similarities, differences, patterns and change (40-60months UtW TW)
- Children find out and explore (CoL Playing and exploring)
- Explore the natural world around them. (DM – UTW – Reception)
- Children talk about their ideas and choose resources needed (ELG – Personal, social and emotional development – self-confidence and awareness)
- Children choose ways to do things (CoL Creating and thinking critically)
- Use talk to help work out problems and organise thinking and activities and to explain how things work and why they might happen. (DM – C&L – Reception)
- Create collaboratively, sharing ideas, resources and skills. (DM – EAD – Reception)
- Gives meaning to marks they make as they draw, write and paint (30-50 months – Literacy – writing)
- Compare length, weight and capacity. (DM – Maths – Reception)
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. (DM – maths – ELG)
- Children respond to what they hear with relevant comments, questions or actions. (ELG – Communication and language – Listening and attention)
- Children enjoy what they set out to do (CoL Active learning)
- Articulate their ideas and thoughts in well-formed sentences. (DM - Communication and language – Reception)
- Describe events in some detail. (DM - Communication and language – Reception)

Year 1

**Ask simple questions and recognise that they can be answered in different ways.**

- While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, how things change)
- The children answer questions developed with the teacher often through a scenario.

**Observe closely, using simple equipment.**

- Children explore the world around them. They make observations to support identification. They use appropriate senses to observe, aided by equipment e.g. magnifiers.
- They begin to take measurements, initially by comparisons, then using non-standard units.

**Perform simple tests.**

- Children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify and compare.

**Identify and classify.**

- Children use their observations and then testing to compare objects, materials and living things.

**Gather and record data to help answer questions.**

- The children record their observations e.g. using photographs, drawings, labelled diagrams or in writing.
- They classify using simple prepared tables and sorting rings with given headings.

**Use observations and ideas to suggest answers to questions.**

- Children use their experiences of the world to suggest appropriate answers to questions. They are supported to relate these to observations they have made.
- The children use their data to recognise e.g. the most suitable product for purpose from the data.

Year 2

**Ask simple questions and recognise that they can be answered in different ways.**

- While exploring the world, children continue to develop their ability to ask questions (such as the ways things work, which alternative is better and how things happen).
- Where appropriate, they answer these questions.
- Children are involved in planning how to use resources to answer the questions, helping them to recognise that there are different ways questions can be answered.

**Observe closely, using simple equipment.**

- Children continue to explore the world around them. They make observations to compare and notice change. They can choose equipment to aid the appropriate sense.
- They take measurements, using standard units and can suggest equipment which could be used to take measurements.

**Perform simple tests.**

- Children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

**Identify and classify.**

- Children use their observations and testing to compare. They sort and group these things, identifying their own criteria for sorting.
- They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.

**Gather and record data to help answer questions.**

- The children record their observations e.g. using photographs, drawings, labelled diagrams or in writing. They record their measurements e.g. prepared tables.
- They classify using simple prepared tables and sorting rings, some of which may share values e.g. Venn diagram
- Children relate their findings back to the original question.

**Use observations and ideas to suggest answers to questions.**

- Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.
- The children recognise 'biggest and smallest', 'best and worst' etc. from their data.

Year 3

**Ask relevant questions and use different types of scientific enquiry to answer them.**

- Children consider their prior knowledge when asking questions. They independently use a range of question stems.
- Given a range of resources and with support, children choose the most appropriate enquiry to answer the question. They recognise when questions cannot be answered through their practical work.

**Make systematic, careful observations. Where appropriate, take accurate measurements using standard units and a range of equipment, inc. thermometers & data loggers.**

- Children make systematic and careful observations.
- They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

**Set up simple practical enquiries, comparative and fair tests.**

- The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.
- As part of a group, follow a plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

**Gather, record, classify & present data in a variety of ways to help answer questions. Record findings using simple, scientific language, drawings, labelled diagrams, keys, bar charts & tables.**



	<ul style="list-style-type: none"> <li>Children sometimes decide how to record/present evidence. They record their observation e.g. photos, labelled diagrams or writing. They record measurements e.g. using tables, tally charts &amp; bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.</li> </ul> <p><b><u>Report on findings, including oral and written explanations, displays or presentations of results and conclusions.</u></b></p> <ul style="list-style-type: none"> <li>They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</li> </ul> <p><b><u>Identify differences, similarities or changes related to simple scientific ideas and processes.</u></b></p> <ul style="list-style-type: none"> <li>Children interpret their data to generate simple comparative statements based on their evidence.</li> </ul> <p><b><u>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</u></b></p> <ul style="list-style-type: none"> <li>Children draw conclusions based on their evidence and subject knowledge.</li> <li>Use their evidence to suggest further items to test using the same method e.g. distance travelled by a car on another surface. Knowing this can improve reliability.</li> </ul> <p><b><u>Use straight forward scientific evidence to answer questions or to support findings.</u></b></p> <ul style="list-style-type: none"> <li>Children answer their own questions based on observations they have made or measurements they have taken. The answers are consistent with the evidence.</li> </ul>
Year 4	<p><b><u>Ask relevant questions and use different types of scientific enquiry to answer them.</u></b></p> <ul style="list-style-type: none"> <li>Children consider their prior knowledge when asking questions. They independently ask a range of questions.</li> <li>Given a range of resources, children begin to suggest the most appropriate enquiry and how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through their practical work. With support, they identify the type of enquiry that they have chosen.</li> </ul> <p><b><u>Make systematic, careful observations. Where appropriate, take accurate measurements using standard units and a range of equipment, inc. thermometers &amp; data loggers.</u></b></p> <ul style="list-style-type: none"> <li>The children make systematic and careful observations.</li> <li>Children suggest the most suitable piece of equipment to take accurate measurements.</li> </ul> <p><b><u>Set up simple practical enquiries, comparative and fair tests.</u></b></p> <ul style="list-style-type: none"> <li>With support, they plan and carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</li> </ul> <p><b><u>Gather, record, classify and present data in a variety of ways to help answer questions. Record findings using simple, scientific language, drawings, labelled diagrams, keys, bar charts and tables.</u></b></p> <ul style="list-style-type: none"> <li>Children decide how to record and present evidence. They record their observation e.g. photos, pictures, labelled diagrams or writing. They record measurements e.g. using tables, tally charts and bar charts. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.</li> <li>Children are supported to present the same data in different ways in order to help with answering the question.</li> </ul> <p><b><u>Report on findings, including oral and written explanations, displays or presentations of results and conclusions.</u></b></p> <ul style="list-style-type: none"> <li>They choose the most appropriate way to communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</li> </ul> <p><b><u>Identify differences, similarities or changes related to simple scientific ideas and processes.</u></b></p> <ul style="list-style-type: none"> <li>Children begin to identify patterns and causal relationships.</li> </ul> <p><b><u>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</u></b></p> <ul style="list-style-type: none"> <li>They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</li> <li>Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</li> </ul> <p><b><u>Use straight forward scientific evidence to answer questions or to support findings.</u></b></p> <ul style="list-style-type: none"> <li>Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. Answers are consistent with the evidence and they identify where this is not the case, offering some possible explanations.</li> </ul>
Year 5	<p><b><u>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</u></b></p> <ul style="list-style-type: none"> <li>Children independently ask scientific questions. This may involve asking further questions based on their developed understanding following an enquiry.</li> <li>Given a wide range of resources, children decide how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.</li> <li>Children select from a range of practical resources, how to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide and justify how and which measurements to take over time.</li> </ul> <p><b><u>Take measurements, using a wide range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</u></b></p> <ul style="list-style-type: none"> <li>Children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.</li> </ul> <p><b><u>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</u></b></p> <ul style="list-style-type: none"> <li>The children decide how to record and present evidence. They record observations e.g. annotated photos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.</li> </ul> <p><b><u>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 other presentations.</u></b></p>



Year 6

- In conclusions, children identify causal relationships and patterns; identify results that do not fit the overall pattern; and explain findings using their subject knowledge.
- They communicate their findings to an audience using relevant scientific language and illustrations.

**Use test results to make predictions to set up further comparative and fair tests.**

- Children use scientific knowledge from enquiries to make predictions they can investigate using comparative and fair tests.

**Identify scientific evidence that has been used to support or refute ideas or arguments.**

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. They talk about how their scientific ideas change due to new evidence that they have gathered.

**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**

- Children raise further questions: based on developed understanding following an enquiry; to test findings from secondary evidence or an area of personal significance
- With knowledge of available resources, children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through their practical work.
- Children suggest how to gather evidence to answer their questions. They recognise variables and can justify which they will control. They decide what observations or measurements to make over time and for how long.

**Take measurements, using a wide range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**

- During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).

**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**

- Children present the same data in different ways in order to help with answering the question and justify which way answers the question more efficiently.

**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 other presentations.**

- They identify any limitations that reduce the trust they have in their data.
- They evaluate, e.g. the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.

**Use test results to make predictions to set up further comparative and fair tests.**

- Use scientific knowledge from enquiries to make predictions they can investigate using comparative or fair tests and justify further testing and method of enquiry.

**Identify scientific evidence that has been used to support or refute ideas or arguments.**

- Children discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.
- Children talk about how new discoveries change scientific understanding.