



## Science at Moat Hall Primary Academy

### Intent

Moat Hall's Primary's Science curriculum aims to develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future.

We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. Our curriculum is inclusive and meaningful, so all pupils may experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges.

Our curriculum aims to encourage critical thinking and empower pupils to question the hows and whys of the world around them.

Our scheme encourages:

- A strong focus on developing knowledge *alongside* scientific skills across Biology, Chemistry and Physics.
- Curiosity and excitement about familiar and unknown observations.
- Challenging misconceptions and demystifying truths.
- Continuous progression by building on practical and investigative skills across all units.
- Critical thinking, with the ability to ask perceptive questions and explain and analyse evidence.
- Development of scientific literacy using wide-ranging, specialist vocabulary.

Our curriculum enables pupils to meet the end of key stage attainment targets in the national curriculum and the aims also align with those set out in the national curriculum.

### Implementation

In order to meet the aims of the National curriculum for Science and in response to the Ofsted Research review into Science, we have identified the following key strands:

- **Scientific knowledge and understanding of:**
  - Biology - living organisms and vital processes.
  - Chemistry - matter and its properties.
  - Physics - how the world we live in 'works'.
- **Working scientifically** - processes and methods of science to answer questions about the world around us.
- **Science in action** - uses and implications of science in the past, present and for the future.

We have implemented a spiral curriculum, with essential knowledge and skills revisited with increasing complexity, allowing pupils to revise and build on their previous learning. A range of engaging recall activities promote frequent pupil reflection on prior learning, ensuring new learning is approached with confidence. The **Science in action** strand is interwoven throughout the curriculum to make the concepts and skills relevant to pupils and inspiring for future application. Cross-



curricular links are included throughout each unit, allowing children to make connections and apply their Science skills to other areas of learning.

Each unit is based upon one of the key science disciplines; Biology, Chemistry and Physics and to show progression throughout the school we have grouped the National curriculum content into six key areas of science:

**Plants**  
**Animals, including humans**  
**Living things and habitats**  
**Materials**  
**Energy**  
**Forces, Earth and space.**

Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. As suggested in Ofsted's Science research review (April 2021), the '**working scientifically**' skills are integrated with conceptual understanding rather than taught discretely. This provides frequent, but relevant, opportunities for developing scientific enquiry skills. It also utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.

Each year group has an optional exploratory 'Making connections' unit that delves beyond the essential curriculum, assimilating prior knowledge and skills to evoke excitement and to provide an additional method of assessing scientific attainment.

Lessons incorporate various teaching strategies from independent tasks to paired and group work, including practical, creative, computer-based and collaborative tasks. This variety means that lessons are engaging and appeal to those with different learning styles. Guidance for adapting the learning is available for every lesson to ensure that all pupils can access learning, and opportunities to stretch pupils' learning are available when required. Knowledge organisers for each unit help to identify prior and future curriculum links to make the scheme as meaningful as possible and reinforce key technical terms.

## **Impact**

The impact of our science curriculum can be constantly monitored through both formative and summative assessment opportunities. Each unit has a unit quiz and a knowledge and skills catcher, which can be used at the beginning and/or end of the unit to provide a summative assessment. Opportunities for children to communicate using scientific vocabulary will also form part of the assessment process in each unit.

Pupils should leave Moat Hall equipped with the requisite skills and knowledge to succeed in key stage 3 Science. They will have the necessary tools to confidently and meaningfully question and explore the world around them as well as critically and analytically experiencing and observing phenomena. Pupils will understand the significance and impact of Science on society.



We expect our children to:

- Develop a body of foundational knowledge for the Biology topics in the National curriculum: Plants; Animals, Including Humans; Living Things and Their Habitats; Evolution and Inheritance.
- Develop a body of foundational knowledge for the Chemistry topics in the National curriculum: Everyday Materials; Uses of Everyday Materials; Properties and Changes of Materials; States of Matter; Rocks.
- Develop a body of foundational knowledge for the Physics topics in the National curriculum: Seasonal Changes; Forces and Magnets; Sound; Light; Electricity; Earth and Space.
- Be able to evaluate and identify the methods that 'real world' scientists use to develop and answer scientific questions.
- Identify and use equipment effectively to accurately gather, measure and record data.
- Be able to display and convey data in a variety of ways, including graphs.
- Analyse data in order to identify, classify, group, and find patterns.
- Use evidence to formulate explanations and conclusions.
- Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.
- Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.
- Meet the end of key stage expectations outlined in the National curriculum for Science.



## Science overview of topics

2023 – 2024

	Autumn term		Spring term		Summer term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	Health	Seasonal Changes	Properties and changes	Everyday materials	Plants Lifecycles	Consolidation
Year 1	Seasonal Changes	Everyday materials	Sensitive Bodies	Comparing animals	Introduction to plants	Consolidation
Year 2	Habitats	Microhabitats	Uses of everyday materials	Life cycles and health	Plant growth	Consolidation
Year 3	Movement and nutrition	Forces and magnets	Rocks and soil	Light and shadows	Plant reproduction	Consolidation
Year 4	Digestion and food	Electricity and circuits	Classification and changing habitats	States of matter	Sound and vibrations	Consolidation
Year 5	Mixtures and separation	Properties and changes	Earth and space	Life cycles and reproduction	Imbalanced forces	Human Timeline
Year 6	Classifying big and small	Light and reflection	Evolution and inheritance	Circuit, batteries and switches	Circulation and exercise	Consolidation



## Science progression map

Progression of Scientific Knowledge and Understanding PLANTS			
	<b>EYFS</b> To explore plants in the natural world around them. To plant and care for plants. To explore different parts of a plant.		
	<b>Year 1</b> <b>Introduction to plants</b>	<b>Year 2</b> <b>Plant growth</b>	<b>Year 3</b> <b>Plant reproduction</b>
Plants structure and function	To know a variety of common plants, and how they differ.		To understand the functions of the basic parts of a plant and the relationship between structure and function.
	To know that deciduous trees lose their leaves seasonally, but evergreen trees do not.		To know that water is transported within a plant from the root, through the stem, to the leaves.
	To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.		
Plant growth and needs	To begin to understand how plants grow and change over time.	To know that seeds and bulbs grow into seedlings by producing roots and shoots.	To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits. To understand that the needs for growth and health vary from plant to plant.
		To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits.	
		To know that seeds need water to germinate.	
		To know that plants need water, light and a suitable temperature for growth and health.	
Plant			To know the life cycle of a plant from seed to mature plant.



			To know that flowers are the reproductive organ of a plant.
			To know that the process of pollination is the transfer of pollen to the female part of the flower.
			To know that the process of seed formation is the growth of a seed after pollination/fertilisation.
			To know some different methods of seed dispersal and the benefits of each.

Progression of Scientific Knowledge and Understanding ANIMALS INCLUDING HUMANS			
	EYFS To talk about common animals. To name some parts of animals. To name different animals and their babies. To identify, label and draw parts of the body (human). To explore with their 5 senses. To talk about the human life cycle stages.		
	<b>Year 1</b> <b>Sensitive bodies</b> <b>Comparing animals</b>	<b>Year 2</b> <b>Life cycles and health</b>	<b>Year 3</b> <b>Movement and nutrition</b>
Animal growth	To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).	To understand how living things, change, and that animals have offspring that grow into adults. To know which offspring comes from which parent animal. To know the stages in some animal life cycles.	
Animal structure	To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell)		To know that animals can be grouped based on the presence of a skeleton.



	<p>To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth).</p> <p>To know the five main senses: sight, smell, hearing, taste and touch.</p> <p>To know that eyes are used for sight, the nose is used for smell, ears are used for hearing, the tongue and mouth are used for taste and the skin is used for touch.</p>		<p>To know that the skeleton in humans and some animals is used for movement, protection and support.</p> <p>To know that the muscular system in humans and some animals works with the skeleton for movement.</p> <p>To know the main bones in the body.</p>
Health and nutrition	To know that a carnivore is an animal that eats other animals and to give some examples.	To know that animals, including humans, need water, food and air to survive.	To know that animals, including humans, need the right types and amount of nutrition.
	To know that a herbivore is an animal that eats only plants and to give some examples.	To understand the importance of exercise, a balanced diet and hygiene for humans.	To understand that humans cannot make their own food and therefore eat to get the nutrition needed.
	To know that an omnivore is an animal that eats both animals and plants, and to give some examples.		<p>To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions.</p> <p>To know that a balanced diet should include all food groups.</p> <p>To describe the diets of different animals.</p>

Progression of Scientific Knowledge and Understanding ANIMALS INCLUDING HUMANS			
	EYFS To talk about how we keep our teeth healthy.		
	Year 4 Digestion and food	Year 5 Human timeline	Year 6 Circulation and exercise
Animal		To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly).	



		To describe changes that occur during puberty (in boys and girls). To know that gestation periods vary across mammals.	
Animal structure and function	To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.		To know the main parts of the human circulatory system (heart, blood vessels and blood). To know that the heart pumps blood around the body. To know that the blood vessels transport blood around the body. To know that the blood transports vital substances around the body, including oxygen and nutrients. To understand the relationships between different organ systems
	To know that teeth can be damaged, including the effect of sugary and acidic food. To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. To describe the teeth of carnivores and herbivores, and understand why they are different To know that predators hunt for their food and prey are the animals being hunted To know that producers make their own food. To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on		To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions. To know that the heart rate is the number of beats per minute and breathing rate is the number of breaths per minute. To know that exercise increases heart and breathing rates.





**Progression of Scientific Knowledge and Understanding  
LIVING THINGS AND THEIR HABITATS**

	<p><b>EYFS</b>          To talk about plants and animals, looking at similarities and differences.          To look at the life cycle of a plant.          To explore what plants need to grow.          To know what a habitat is.          To explore different animal habitats</p>			
	<p><b>Year 2 Habitats Microhabitats</b></p>	<p><b>Year 4 Classification and changing habitats</b></p>	<p><b>Year 5 Life cycles and reproduction</b></p>	<p><b>Year 6 Classifying big and small Evolution and inheritance</b></p>
<p align="center"><b>Characteristics of living things</b></p>	<p>To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.</p> <p>To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.</p>	<p>To know that living things can be grouped in different ways.</p> <p>To know that a classification key can be used to group and identify plants and animals.</p> <p>To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone.</p> <p>To know that plants can be grouped into flowering or non-flowering varieties.</p> <p>To know that flowering plants include grasses and non-flowering plants includes ferns and mosses.</p> <p>To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish.</p>		<p>To know that 'organism' is a term used to refer to an individual living thing.</p> <p>To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye.</p> <p>To know the characteristics of the different groups of vertebrates and commonly found invertebrates.</p>

		To know that invertebrate groups include snails, slugs, worms, spiders and insects.		
<b>Variation and inheritance</b>	To know a variety of plants and animals and describe some differences.		To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again.	To know that living things have changed over time.
			To know that all living things must reproduce for the species to survive.	To know that fossils provide us with information about living things that inhabited the Earth millions of years ago.
			To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent.	To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents.
			To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).	To know that over time, variation in offspring can affect animals' chances of survival in particular environments.
<b>Habitats and interdependence</b>	To name a variety of habitats, including woodland, ocean, rainforest and seashore.	To know that habitats can change throughout the year and this can be dangerous for living things.		To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.
	To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive.	To know that humans can have both a positive and negative impact on the environment.		
	To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter).			
	To know that living things depend upon each other (e.g. for food, shelter.)			



	To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.			
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<b>Progression of Scientific Knowledge and Understanding MATERIALS</b>					
	<b>EYFS</b> To explore different objects. To explore, use and describe a range of materials. To explore a collection of materials of similar/different properties				
	<b>Year 1 Everyday materials</b>	<b>Year 2 Uses of everyday materials</b>	<b>Year 3 Rocks and soils</b>	<b>Year 4 States of matter</b>	<b>Year 5 Mixtures and separation Properties and changes</b>
<b>Identifying and naming</b>	To know that objects are items or things.		To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.)	To know that all substances around us can exist as solids, liquids and gases.	
	To know that a material is what an object is made from.		To know that rocks may contain grains, crystals or fossils.		

	To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.		To know that grains and crystals appear differently and can be used to classify rocks. To know that soils are made from rocks and dead matter.		
Properties and their uses	To know that property refers to how a material can be described	To know why objects are made from particular materials and to give examples of their suitability.	To understand the relationship between the properties of rocks and their uses.	To know that a property of a solid is that it keeps its shape unless a force is applied to it.	To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.
	To describe the physical properties of a variety of everyday materials.	To know that one material can be used for a range of purposes (and to give examples.)		To know that a property of a liquid can flow freely and take on the shape of a container.	
	To understand that materials can be grouped based on their physical properties	To know that different materials can be used for the same purpose (and to give examples.) To know why certain materials are unsuitable for particular objects.		To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.	
Change		To know that a force must be applied to change the shape of a solid object.	To know that fossils can form from the remains of living things.	To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating).	To know that some substances will dissolve in a liquid to form a solution.
		To know that solid objects can be squashed, bent, twisted or stretched	To know that rocks can change over time (e.g. erosion, weathering).	To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).	To know the factors that affect the time taken to dissolve, including temperature and stirring.

		<p>To know that different solid objects may take a different amount of force to change shape.</p>		<p>To know that water can exist as a solid, a liquid or a gas.</p>	<p>To understand that dissolving, mixing and changes of state are reversible changes.</p>
				<p>To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.</p>	<p>To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes.</p>
				<p>To know that water flows around the world in a continuous process called the water cycle.</p>	<p>To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)</p>
				<p>To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour.</p>	
				<p>To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation.</p>	
	<p>To know that the rate of evaporation increases as temperature rises.</p>				

## Progression of Scientific Knowledge and Understanding ENERGY

	<b>Year 3 Light and shadows</b>	<b>Year 6 Light and reflection</b>	<b>Year 4 Sound and vibrations</b>
<b>Sources</b>	To know that light travels from a source (e.g. the Sun, light bulbs and torches).	To know that light travels in waves but that it appears to travel in a straight line.	To understand that sound is a result of vibrations.
	To know that light travels in a straight line from a light source.		
	To know that light is needed to see things and that dark is the absence of light.		
	To know that light from the Sun can be dangerous and how to protect their eyes.		
<b>Transfer</b>	To know that materials reflect light.	To know that shiny surfaces reflect light uniformly whereas dull surfaces scatter the reflected light.	To know that vibrations from sounds travel through mediums to the ear.
	To know that light is reflected uniformly from a shiny surface, such as a mirror.	To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye.	To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds.
	To know that shadows are formed when the light from a light source is blocked by an opaque object.	To understand why shadows have the same shape as the objects that cast them.	To know that different materials provide different amounts of insulation against sound.
		To understand relationships between light sources, objects and shadows	
		To know that when light is reflected off a surface, its direction changes.	
		To know how a periscope works using reflection of light on plane surfaces.	
<b>Factors affecting</b>	To understand how and why shadows change.	To know how light is reflected from a plane surface.	To know a variety of ways to change the pitch or volume of a sound.
	To know that shadows change position and length throughout the day as the Sun changes position in the sky.	To understand how the angle of a reflected ray is affected by the angle of the incoming ray, when reflected from a plane surface.	To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.



			To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.
			To know that sounds get fainter as the distance from the sound source increases.

Progression of Scientific Knowledge and Understanding			
ENERGY			
	Year 4	Year 6	
	<b>Electricity and circuits</b>	<b>Circuits, batteries and switches</b>	
<b>Sources</b>	To know that all electrical appliances need a power source, including batteries or mains electricity.	To know a wider variety of components in a series circuit (including buzzer and motor).	
	To know that an electrical circuit needs a complete path for the electric charge to flow through.	To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.	
	To know the main components in a simple series circuit.		
	To know the precautions for working safely with electricity.		
<b>Transfer</b>	To know that some materials allow electric charge to pass through them easily and these are known as electrical conductors (e.g. metals).		
	To know that some materials do not allow electric charge to pass through them and these are known as electrical insulators (e.g. wood and plastic).		
	To know that metals are used for cables and wires because they are good conductors of electricity.		
	To know that plastic is used to cover cables and wires because it is a good insulator.		
<b>Factors</b>	To understand that an open switch breaks a series circuit so the components will be off.	To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).	
	To understand that a closed switch completes a series circuit so the components will be on.		



	To understand the relationship between bulb brightness and the number of cells in a circuit.	
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<b>Progression of Scientific Knowledge and Understanding FORCES, EARTH AND SPACE</b>				
	<b>EYFS</b> To explore the natural world around them. To describe what they can see, hear, feel etc. To name the 4 seasons. To talk about what we wear and things we do in different seasons. Explore and talk about different forces and how they feel.			
	<b>Year 1 Seasonal changes</b>	<b>Year 5 Earth and space</b>	<b>Year 3 Forces and magnets</b>	<b>Year 5 Imbalanced forces</b>
<b>Key facts</b>	To know the name and order of the four seasons; spring, summer, autumn and winter.	To know that the Sun is a star at the centre of our solar system.	To know some examples of contact and non-contact forces.	To know that gravity is a non-contact force that pulls objects together.





	To know that it is unsafe to look directly at the Sun.	To know that the Sun, Earth and Moon are approximately spherical bodies.	To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism).	To know that air resistance and water resistance are both types of friction.
		To know the names, order and relative positions of the planets and other main celestial bodies.	To know the North and South poles of a magnet.	
		To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.	To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. To know some different examples of magnets, including bar, horseshoe, button and ring, To know some uses of magnets.	
Forces in motion	To know weather associated with the four seasons and how it changes (in the UK).	To know that the Earth and other planets orbit around the Sun.	To know that friction is a contact force that acts between two surfaces to slow an object down.	To know that unsupported objects fall towards the Earth because of gravity.
	To understand that day length varies across the four seasons, with fewer daylight	To know that the tilt of the Earth and its orbit around the Sun causes the seasons.	To know that magnetism is a non-contact force that affects objects containing magnetic metal.	To know that friction, air resistance and water resistance act in the opposite direction to a moving object.



	hours in the winter and more in the summer.	To know that the Moon orbits around the Earth.	To understand that the opposite poles of a magnet attract one another and like poles repel one another.	To know that when forces are imbalanced, the speed, shape or direction of an object changes.
		To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky.		To know that when forces are balanced the speed, shape or direction of an object stays the same.
Factors affecting forces			To know that rougher surfaces have more friction between them than smoother surfaces.	To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement.
			To understand that the strength of different magnets may vary.	To know that the larger the surface area of an object the greater the air or water resistance it creates.



## Progression of Skills WORKING SCIENTIFICALLY

	<b>EYFS</b> To explore and talk about what they see in the natural world. To ask simple questions. To talk about what they observe.		
	<b>KS1</b>	<b>LOWER KS2</b>	<b>UPPER KS2</b>
<b>Posing questions</b>	Exploring the world around them and raising their own simple questions.	Beginning to raise further questions during the enquiry process.	Raising questions throughout the enquiry process.
	Recognising there are different types of enquiry (ways to answer a question).	Considering what makes a testable question.	Identifying testable questions.
	Responding to suggestions of how to answer their questions.	Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.	Selecting the most appropriate enquiry method to answer questions and give justification.
		Beginning to make suggestions about how different questions could be answered	
<b>Planning</b>	Beginning to recognise whether a test is fair.	Beginning to select from options which variables will be changed, measured and controlled.	Suggesting which variables will be changed, measured and controlled.
	With support, deciding if suggested observations are suitable.	Suggesting what observations to make and how long to make them for.	Making and explaining decisions about what observations to make and how long to make them for.
	Ordering a simple method.	Planning a simple method, verbally and in writing.	Writing a method including detail about how to ensure control variables are kept the same
		Beginning to write a simple method in numbered steps.	Writing a method including detail about how to ensure control variables are kept the same
		Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.	Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.



Predicting	Suggesting what might happen, often justifying with personal experience.	Making predictions about what they think will happen by: <ul style="list-style-type: none"> <li>Using scientific knowledge and/or personal experience to explain their prediction (because...)</li> <li>Beginning to consider cause and effect when making predictions, where appropriate.</li> <li>Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)</li> </ul>	Making increasingly scientific predictions by: <ul style="list-style-type: none"> <li>Using previous scientific knowledge and evidence to inform their predictions.</li> <li>Using scientific language to describe a potential outcome or explain why they think something will happen.</li> <li>Making links between topics to evidence a prediction.</li> </ul>
Observing (qualitative)	Using their senses to describe, in simple terms, what they notice or what has changed.	Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.	Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.
Measuring (quantitative)	Using non-standard units to measure and compare.		
	Beginning to use standard units to measure and compare.	Using standard units to measure and compare.	Using standard units to measure and compare with increasing precision (decimals).
	Beginning to use simple measuring equipment to make approximate measurements.	Using measuring equipment with increasing accuracy.	
	Reading simple numbered scales.	Reading scales with unmarked intervals between numbers.	Reading a wider variety of scales with unmarked intervals between numbers.
Researching	Gathering specific information from one simplified, specified source.	Gathering specific information from a variety of sources.	Gathering answers to open-ended questions from a variety of sources.

Recording (diagrams)	Drawing and labelling simple diagrams.	Beginning to draw more scientific diagrams by: <ul style="list-style-type: none"> <li>Using some standard symbols</li> <li>Drawing in 2D to produce simple line diagrams</li> <li>Labelling with more scientific vocabulary</li> </ul>	Drawing scientific diagrams by: <ul style="list-style-type: none"> <li>Using a wider range of standard symbols</li> <li>Drawing with increasing accuracy</li> <li>Labelling with a broader range of scientific vocabulary</li> <li>Annotating diagrams to explain concepts and convey opinions.</li> </ul>
Recording (tables)	Using a prepared table to record results including: <ul style="list-style-type: none"> <li>Numbers</li> <li>Simple observations</li> <li>Tally frequency</li> </ul>	Using a prepared table to record results including more detailed observations.	
		Using tables with more than two columns.	Using tables with columns that allow for repeat readings.
		Identifying and adding headings to tables.	Suggesting headings to tables, including units.
		Beginning to design simple results tables.	Designing results tables with increasing independence with consideration of variables where applicable.
		Calculating the mean average.	
Grouping and classifying	Grouping based on visible characteristics	Grouping based on visible characteristics and measurable properties.	Grouping in a broader range of contexts.
	Organising questions to create a simple classification key.	Populating a pre-prepared branching and number key.	Organising the layout of number and branching keys.
		Choosing appropriate questions for classification keys.	Formulating appropriate questions for classification keys.
Graphing	Representing data using pictograms and block charts.	Representing data using bar charts.	Representing data by using line graphs and scatter graphs.
		Drawing bars with greater accuracy.	Plotting points with greater accuracy.
		Reading the value of bars with greater accuracy.	Reading the value of plotted points with greater accuracy.

<b>Analysing and drawing conclusions</b>	Using their results to answer simple questions.	Writing a conclusion to summarise findings using simple scientific vocabulary.	Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.
		Beginning to suggest how one variable may have affected another.	Suggesting with increasing independence how one variable may have affected another.
		Beginning to quote results as evidence of relationships	Quoting relevant data as evidence of relationships
		Identifying data that does not fit a pattern (anomalous data).	Identifying anomalies in repeat data and excluding results where appropriate.
		Recognising when results or observations do not match their predictions	Comparing individual, class and/or model data to the prediction and recognising when they do not match.
		Beginning to use identified patterns to predict new values or trends.	Using identified patterns to predict new values or trends.
<b>Evaluating</b>	Beginning to recognise whether a test is fair or not.	Beginning to identify steps in the method that need changing and suggest improvements.	Identifying steps in the method that need changing and suggesting improvements.
		Beginning to identify which variables were difficult to control and suggesting how to better control them.	Identifying which variables were difficult to control and suggesting how to better control them.
		Commenting on the degree of trust by reflecting on: <ul style="list-style-type: none"> <li>Results that do not fit a pattern (anomalies)</li> <li>The quality of results (accurate measurements and maintaining control variables).</li> </ul>	Commenting on the degree of trust by also reflecting on: <ul style="list-style-type: none"> <li>Accuracy (human error with equipment)</li> <li>Reliability (repeating results)</li> <li>Sources of information (e.g. websites, books).</li> </ul>
		Beginning to identify new questions that would further the enquiry.	Posing new questions in response to the data, that would extend the enquiry.
			Deciding what data to collect to further test direct relationships.

**Progression of Knowledge**



SCIENCE IN ACTION		
KS1	LOWER KS2	UPPER KS2
To know about famous scientists throughout history.		
To know about a range of jobs and careers that use scientific knowledge and methods.		
To know about the work of modern-day scientists.		
To know about science in the news and recent discoveries.		
To explore spiritual, moral, social and cultural links with Science.		
	The know about the methods and equipment used by scientists throughout history and how these have led to modern methods.	
	To understand how scientific knowledge has changed over time, leading to the current understanding of Science.	
	To know about current scientific research and what it aims to achieve in the future.	
	To understand that mistakes can lead to new discoveries.	
	To know that collaboration and peer reviewing is essential for effective scientific progress.	
		To know that collaboration and peer reviewing is essential for effective scientific progress.