

Science at Perton First School



Curriculum Intent

At Perton First School, we believe that all of our pupils should have the opportunity to develop an understanding of the world around them through an interactive, practical and engaging Science curriculum. We encourage children to question their understanding of scientific processes and develop their own conclusions through exploration and investigation. We want the children at Perton First School to become the 'Scientists of the Future' by understanding how scientific processes impact on our everyday lives, the lives of other living things and how they could affect our lives in the future.

Our Science Policy follows The National Curriculum 2014 Science Guidelines and 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 in the future.

Implementation

A high-quality science education provides foundations for understanding the world. Science has changed our lives and is vital to the world's future prosperity. Through building key foundational knowledge and concepts, pupils will be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Your children will be encouraged to understand how key knowledge and concepts can be used to explain what is occurring, predict how things will behave and analyse causes. This understanding will be consolidated through their appreciation of applications of science in society and the economy.

Impact

In teaching Science, we are developing in our children:

- a positive attitude towards science and an awareness of its fascination
- an understanding of science through a process of enquiry and investigation
- confidence and competence in scientific knowledge, concepts and skills
- an ability to reason, predict, think logically and to work systematically and accurately
- an ability to communicate scientifically
- the initiative to work both independently and in co-operation with others
- the ability and understanding to use and apply science across the curriculum and real life

We measure the impact of the science curriculum by listening to the views and opinions of the children and by monitoring the attainment levels of our pupils through assessment trackers.

I am a... Super Scientist

Vision and Values

I have happy memories of Science
I enjoy working scientifically, investigating scientific ideas and setting up practical enquiries.
I feel safe while exploring new scientific concepts.
I feel valued when my predictions are celebrated even when they are.
I demonstrate British Values in Science.

Head

I know how to conduct a fair test and how different variables can impact upon the outcome
I understand that science is a valuable subject to learn for our future
I am willing to take a risk when investigating new science concepts



When I leave Perton First School, I will be able to:

Work scientifically
Investigate scientific concepts and report findings using diagrams, graphs and tables
Recognise and identify the properties of different materials
Understand the life cycle of a plant and how the different parts of a plant function
Learn about animals, including humans, and their habitats
Explain the difference between the different seasons
Discover how fossils and different types of rocks are formed
Identify how we see things and how shadows are formed when a light source is blocked
Observe how objects move when force is applied to it and how magnets attract and repel
Discuss items that need electricity to function and construct our own electrical circuits
Understand how sounds are made, how they travel and that sounds can change in volume and pitch



Hand

I can apply English and maths skills to my science lessons
I can learn to live a healthy and active lifestyle

Heart

I am proud to feel a part of a team as we conduct experiments as a group
I appreciate others discoveries whilst we are examining and analysing the results of a study
I care about helping the environment and understanding how we can look after it.

Science - Units of Work



Early Years		KS1		LKS2	
Nursery	Reception	Year 1	Year 2	Year 3	Year 4
Unit 1 Little Chicks: Getting to know you Little Owls: This is me	Unit 1 Family Tree!	Unit 1 Working Scientifically Materials	Unit 1 Working Scientifically Living Things and Their Habitats	Unit 1 Working Scientifically Light	Unit 1 Working Scientifically States of Matter
Unit 2 Little Chicks: Special People Little Owls: Twinkle, Twinkle,	Unit 2 Celebrate good times, come on!	Unit 2 Working Scientifically Animals including humans	Unit 2 Working Scientifically Materials	Unit 2 Working Scientifically Rocks	Unit 2 Working Scientifically Electricity
Unit 3 Little Chicks: It's cold outside Little Owls: Over the Rainbow	Unit 3 Traditional Tales	Unit 3 Working Scientifically Materials Seasonal Changes	Unit 3 Working Scientifically Living Things and Their Habitats	Unit 3 Working Scientifically Forces and Magnets	Unit 3 Working Scientifically Living Things and Their Habitats
Unit 4 Little Chicks: What a wonderful world! Little Owls: Down at the bottom of the garden	Unit 4 All things bright and beautiful	Unit 4 Working Scientifically Materials STEM	Unit 4 Working Scientifically STEM Animals including humans Healthy Living	Unit 4 Working Scientifically Forces and Magnets STEM	Unit 4 Working Scientifically Animals including humans STEM
Unit 5 Little Chicks: The Three Bears Little Owls: Castle on a Hill	Unit 5 Dinosaur World	Unit 5 Working Scientifically Plants	Unit 5 Working Scientifically Plants	Unit 5 Working Scientifically Plants	Unit 5 Working Scientifically Sound
Unit 6 Little Chicks: Water, water, everywhere! Little Owls: Splash, Splash!	Unit 6 Down in the ocean/ ahoy there!	Unit 6 Working Scientifically Animals including humans	Unit 6 Working Scientifically Animals including humans	Unit 6 Working Scientifically Animals including humans	Unit 6 Working Scientifically Animals including humans

Understanding the World



Year Group	Milestones (Children at the expected level of development will)	Content
Nursery 0 Little Chicks	<p>Explore sensory materials.</p> <p>Delight in the changing seasons.</p>	<p>The children at our school have a wealth of experiences relating to the natural world, people, culture and communities and past and present.</p>
Nursery 1 Little Chicks	<p>Explore a wide range of materials and sensory play trays.</p> <p>Show an interest in rain, puddles, flowers, pebbles etc.</p> <p>Notice difference between people and celebrate.</p>	<p>We enjoy celebrating festivals from around the world! We include festivals celebrated by our current cohorts. We look at things from the past in adult-led activities.</p>
Nursery 2 Little Owls	<p>Know that there are different places in the world. Develop positive attitudes to differences between people. Understand about different careers that are available to all people.</p> <p>Talk about different materials and what happens when their properties change. Explore nature and what happens through</p>	<p>Our outdoor spaces are well used. We work with the seasons to learn about weather and change. We stop to look at heavy rain, a rainbow or the first frost. We freeze trays and objects outside in the winter to explore melting the next day. We make collections of objects in autumn to explore and discuss growth and change. We plant bulbs and seeds and watch them grow. We hatch eggs and have visits from animals and their owners to learn how to care for living things.</p>
Reception ELG	<p>Past and Present:</p> <p>Talk about the lives of the people around them and their roles in society; - Know some similarities and differences between things in the past and now, drawing on their experiences and what has been read in class; - Understand the past through settings, characters and events encountered in books read in class and storytelling;</p> <p>People, Culture and Communities:</p> <p>Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps; - Know some similarities and differences between different religious and cultural communities in this country, drawing on their experiences and what has been read in class; - Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts and – when appropriate – maps.</p> <p>The Natural World:</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants; - 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; - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>In our Discovery Zone, we have a range of STEM activities for the children to become absorbed in. They explore materials finding out which are useful for specific jobs and how they can be changed. We have lots of technology toys such as robots and remote control toys for the children to explore. They have challenges to build bridges or to build a tower as high as themselves. We encourage collaborative learning and sustained shared thinking in these challenges.</p>

Science - Units of Work



Early Years

Nursery

Sequence of knowledge and skills

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Unit 1 Working Scientifically Animals including humans Seasonal Changes			Animals, zoos, food, habitats Dear Zoo	Animals, zoos, food, habitats Dear Zoo	Animals, zoos, food, habitats Dear Zoo	Autumn Vocab, leaves and collections
Unit 2 Working Scientifically STEM	Explore how things work (STEM, polydron shapes, puzzles, slime, gloop) Talk about shapes and how they fit together triangle, side, straight, curved, square	Explore how things work (STEM, polydron shapes, puzzles, slime, gloop) Talk about shapes and how they fit together triangle, side, straight, curved, square	Explore how things work (STEM, magnets, ice)	Explore how things work (STEM, magnets, ice)		
Unit 3 Working Scientifically Plants Animals	Percy, park, pond, animals, trees, plants, fence, flowers Look at the pond area outside and talk about what needs to be done to make it better Text: Percy the Park Keeper Explore how things work (STEM, polydron shapes, puzzles, slime, gloop) How does it feel? What is it like? Is it slimy/gooey/sticky/soft/ hard/crusty/crumbly	Outdoor scavenger hunts Write letters asking parents, carers and the local community for support in building our pond. Send a letter to Codsall and Wergs garden centre pond shop. Text: Percy the Park Keeper Plants and trees in a pond Tree, oak, pine, fir, plant, flower, leaves, stem, roots		Ducks, ducklings, webbed feet, feather, down, beak, food, eggs, speckled, nest, pond Boy/girl/him/her/he/she Text: It's Splashing Time		Invite in an expert who has their own pond in their garden and can explain to us what it is like Pond, reed, lily pad, frog, tadpole, fish, flower, swan, duck, goose, dragonfly
Unit 4 Working Scientifically Plants STEM		Retelling the story of the Ugly Duckling with dressing up or puppets. Make puppets to help to retell the story.	Look at the differences between ducks and swans.	Lifecycles Planting bulbs, flowers and seeds		
Unit 5 Animals Living Things and Their Habitats	Eggs and chicks What's in the egg? Small worlds and farms	Eggs and chicks What's in the egg? Small worlds and farms	Reptiles What pets I have at home Habitats Text: The Greedy Python	Reptiles What pets I have at home Habitats Text: The Greedy Python	Dinosaurs Texts: Harry and his bucket full of dinosaurs/Dinosaur Roar	
Unit 6 Animals Living Things and Their Habitats	Sea creatures	Sharing a Shell The Rainbow Fish	Commotion in the Ocean Mr Seahorse Seahorse Poem	The Rainbow Fish		

Science - Units of Work



Early Years

Reception

Sequence of knowledge and skills

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Unit 1 Working Scientifically Animals including humans Seasonal Changes			Exploring the natural world; see, feel and hear around them in Explorer's World		Discuss seasons, which season is it?	Joining parts together to create an end product (Skeleton) Text: Funny Bones—My body has an inside? Learning the song 'Dem Bones'
Unit 2 Working Scientifically Materials (STEM) Seasonal Changes			Discuss the changes in Season- Summer to Autumn			Discuss change in season Autumn to Winter Hot/cold
Unit 3 Working Scientifically Plants STEM Materials	Comparing different fruits from different countries to the UK The Enormous Turnip, Jack and The Beanstalk, Billy Goats Gruff, The Three Little Pigs, Ginger Bread Man and Goldilocks and The Three Bears.	Planting beanstalks The Enormous Turnip, Jack and The Beanstalk, Billy Goats Gruff, The Three Little Pigs, Ginger Bread Man and Goldilocks and The Three Bears.	How to make a strong bridge The Enormous Turnip, Jack and The Beanstalk, Billy Goats Gruff, The Three Little Pigs, Ginger Bread Man and Goldilocks and The Three Bears.	To look at different materials and describe them. The Enormous Turnip, Jack and The Beanstalk, Billy Goats Gruff, The Three Little Pigs, Ginger Bread Man and Goldilocks and The Three Bears.		Review beanstalks and send home The Enormous Turnip, Jack and The Beanstalk, Billy Goats Gruff, The Three Little Pigs, Ginger Bread Man and Goldilocks and The Three Bears.
Unit 4 Working Scientifically Plants Animals STEM	Seasons- Change from Winter to Spring	Spring/ New Growth	Growth and change Hungry Caterpillar/ Minibeasts		Chicks/Easter	
Unit 5 Working Scientifically Animals	Text: Eggs out/foot prints Chicks Discuss their development		Discuss the changes of the Earth (Green house gas) Understanding changes of heating and cooling	Skeleton's of Dinosaurs Write about a dinosaur Non-Fiction- Facts about Dinosaurs	Text: Winnie's Dinosaur Day Comparing Earth to when Dinosaurs were alive	
Unit 6 Working Scientifically Animals Materials	Comparing water species to this country and Africa	Discuss the changes of the Earth (Green house gas) Understanding changes of heating and cooling	Comparing Earth to when Dinosaurs were alive Use technology to support my learning	Describe what they can see feel and hear outdoors		Learning the effects of water freezing

Science - Units of Work



KS1

Year 1

Sequence of knowledge and skills

Unit 1 Working Scientifically Materials	<p>Distinguish between an object and the material from which it is made.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Big Q - What would be the best material for...</p>	<p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Identifying and classifying.</p> <p>Big Q - What aren't teapots made from chocolate?</p>	<p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Identifying and classifying.</p> <p>Big Q - Why are some objects made from different metals?</p>	<p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Using their observations and ideas to suggest answers to questions.</p>
Unit 2 Working Scientifically Animals including humans	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identifying and classifying.</p> <p>Big Q - Are humans animals too?</p>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identifying and classifying.</p>	<p>Describe and compare the structure of fish and amphibians.</p> <p>Identifying and classifying.</p>	<p>Describe and compare the structure of reptiles and birds.</p> <p>Identifying and classifying.</p>	<p>Describe and compare the structure of mammals (including pets).</p> <p>Identifying and classifying.</p>	<p>Compare fish, amphibians, reptiles, birds and mammals.</p> <p>Identifying and classifying.</p>
Unit 3 Working Scientifically Seasonal Changes	<p>Name the 4 seasons and compare the differences.</p> <p>Identifying and Classifying</p> <p>Big Q - What is the difference between the seasons?</p>	<p>Observe changes across the 4 seasons.</p> <p>Gathering and recording data to help in answering questions.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Big Q - What is the difference between the seasons?</p>	<p>Describe weather associated with the seasons.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Big Q - Why don't you have snow in the summer?</p>	<p>Understand and describe how day length varies.</p> <p>Gathering and recording data to help in answering questions.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Big Q - Why is night time longer in the winter?</p>	<p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Create a weather report (verbally) using a picture as a stimulus. The children can roleplay the role of a weather reporter.</p>	<p>Pupils should be taught that it is not safe to look directly at the sun.</p> <p>Discuss the reasons why and how we can protect our eyes.</p>
Unit 4 Working Scientifically Materials STEM	<p>Distinguish between an object and the material from which it is made.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Identify the simple physical properties of a variety of everyday materials.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Describe the simple physical properties of a variety of everyday materials.</p>	<p>If you were an engineer, what would you do?</p>	<p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Performing simple tests.</p>
Unit 5 Working Scientifically Plants	<p>Identify and name a variety of common wild and garden plants.</p> <p>Identifying and classifying.</p> <p>Big Q - What plants do you have in your garden?</p>	<p>Identify and name a variety of common wild and garden plants.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Go for a walk around school to identify different plants and flowers, can they spot the common ones?</p>	<p>Identify and name a variety of deciduous and evergreen trees.</p> <p>Identifying and classifying.</p> <p>Big Q - Do all trees lose their leaves in autumn?</p> <p>Can they classify evergreen and deciduous trees?</p>	<p>Identify the basic structure of a variety of common flowering plants, including trees.</p> <p>Identifying and classifying.</p> <p>Big Q - What is the most important part of a plant?</p> <p>Label practically.</p>	<p>Identify the basic structure of a variety of common flowering plants, including trees.</p> <p>Identifying and classifying.</p> <p>Big Q - What is the most important part of a plant?</p> <p>Labelling pictorially.</p>	<p>Describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Can they answer the Big Q?</p> <p>Using their observations and ideas to suggest answers to questions</p> <p>Big Q - What is the most important part of a plant?</p>
Unit 6 Working Scientifically Animals including humans	<p>Identify, name the basic parts of the human body.</p> <p>Identifying and classifying.</p> <p>Big Q - Are humans animals too?</p> <p>Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</p>	<p>Draw and label the basic parts of the human body.</p> <p>Identifying and classifying.</p> <p>Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</p>	<p>Identify which part of the body is associated with each sense.</p> <p>Identifying and classifying.</p>	<p>Understand the importance of bones and muscles.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Big Q - What's more important? Bones or muscles?</p>	<p>Discuss ways to keep our bodies healthy.</p>	<p>Discuss the importance of a balanced diet.</p> <p>Classify food and drink into healthy and unhealthy.</p>

Science - Units of Work



KS1

Year 2

Sequence of knowledge and skills

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Unit 1 Working Scientifically Living Things and Their Habitats	What is in our sensory garden? Child led enquiry- explore the sensory garden, using bug hunt equipment. Record simply (photographs) findings. Gathering and recording data to help in answering questions.	Identify and name a variety of plants and animals in their habitats, including microhabitats Asking simple questions and recognising that they can be answered in different ways. Identifying and classifying.	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. Visit Bluebell Wood Observe the microhabitats/ explore local environment. Big Q - Why don't fish live in trees?	Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Observe the microhabitats/ explore local environment.	Describe how animals obtain their food from plants and other animals. Asking simple questions and recognising that they can be answered in different ways. Identifying and classifying.	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. Asking simple questions and recognising that they can be answered in different ways. Identifying and classifying.
Unit 2 Working Scientifically Materials	Identify and compare the uses of a variety of every day materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Identifying and classifying. Big Q - What materials would be best for?	Uses of specific materials- Children to investigate a car and a house. What are certain materials used? What makes them good for the job? (squashing, bending, twisting, stretching) Big Q - Your window is made from wood...	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Big Q - Do materials always stay the same shape? Observing closely, using simple equipment. Performing simple tests. Using their observations and ideas to suggest answers to questions.	Teach rigid, waterproof, opaque, transparent, flexible. Children to investigate and record different objects from materials and describe their properties Big Q - Your umbrella is made from glass, is that a good thing? Identifying and classifying. Gathering and recording data to help in answering questions. Performing simple tests.	Space Capsule investigation: Children to choose good materials to 'protect the egg'- the important person inside their capsule. Record their materials, reasons and conclusions. Using their observations and ideas to suggest answers to questions. Big Q - Your house is made from steel, good or bad thing?	Properties and uses of materials linked to DT project- space buggies.
Unit 3 Working Scientifically Living Things and Their Habitats	Find out about the basic needs of animals, including humans for survival (water, food and air) Asking simple questions and recognising that they can be answered in different ways. Big Q - Why don't animals shop in supermarkets?	Describe the basic needs of animals, including humans for survival (water, food and air) Asking simple questions and recognising that they can be answered in different ways. Using their observations and ideas to suggest answers to questions.	Compare the basic needs to animals and humans for survival. Do we all need the same things? Do we all get them from the same places? Identifying and classifying. Big Q - Where do animals get their food from?	Investigation: Ask questions/ make observations. Look around the school environment. How does it meet the needs for its living things?	Food Chains. What is a food chain? Describe and explore. Know terms: prey, predator, consumer Big Q - What would happen if one part of the food chain disappeared?	Food chain investigation: Answer questions./ identifying. Children to solve a problem using practical food chains. Big Q - What would happen if one part of the food chain ate something poisonous?
Unit 4 Working Scientifically STEM Plants	Find out and describe how plants needs water, light and a suitable temperature to grow and stay Big Q - What do plants need more?	If you were an engineer, what would you do?	Observe and describe how seeds and bulbs grow into mature plants Set up the experiment, Outline the method. Make a prediction. Big Q - What does a seed need to develop into a plant?	Plant investigation - Continued Observing closely, using simple equipment. Performing simple tests.	Plant investigation - Continued Using their observations and ideas to suggest answers to questions. Gathering and recording data to help in answering questions. Big Q - How do plants change during the year?	Find out and describe how plants needs water, light and a suitable temperature to grow and stay Discuss whether a plant would grow better in the summer or the winter (or both) and why. Which season provides the best conditions for growth? Big Q - How do plants change during the year?
Unit 5 Working Scientifically Animals including humans	Explore the differences between things that are living, dead and things that have never been alive. Asking simple questions and recognising that they can be answered in different ways. Identifying and classifying. Big Q - If something moves, is it alive?	Compare the differences between things that are living, dead and things that have never been alive and discuss two you know. Asking simple questions and recognising that they can be answered in different ways. Identifying and classifying. Big Q - If something moves, is it alive?	Notice that animals, including humans have offspring which grow into adults Big Q - Do all animals have babies like humans do?	Match the offspring of an animal to the adult of the animal/human. Big Q - Do all animals have babies like humans do?	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identifying and classifying. Big Q - Do fish need to drink water? Retrieve - Y1	Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Identifying and classifying. Big Q - What would happen if we only ever ate sweets?
Unit 6 Working Scientifically Animals including humans Healthy Living	Identify the offspring of each animal group. Do they notice anything? E.g. Birds have eggs, mammals have babies. Big Q - Do all animals have babies like humans do?	Practical—outside Investigation about health and fitness Using their observations, what do they notice about their bodies when they exercise? Using their observations and ideas to suggest answers to questions. Big Q - What if we never did any exercise?	Describe the importance for humans of exercise, Big Q - What do we need to live?	Describe eating the right amounts of different types of food and hygiene. Big Q - What do we need to live?	Describe eating the right amounts of different types of food. Create a healthy, balanced diet plate which identifies some of the food groups based on what they eat. Big Q - What would happen if we only ever ate sweets?	Describe how we can look after our own hygiene.

Science - Units of Work



KS2

Year 3

Sequence of knowledge and skills

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Unit 1 Working Scientifically Light	Recognise that they need light in order to see things and that dark is the absence of light. Big Q - What can you see when there is no light? Big Q - What would happen if there was no light?	Notice that light is reflected from surfaces. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Big Q - Is the moon a light source? Does it create its own light?	Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Big Q - Is the sun useful or dangerous? Big Q - How do we protect ourselves from the sun? Big Q - Is it only our skin that needs protection?	Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Setting up simple practical enquiries, comparative and fair tests. Big Q - Why isn't it always sunny if the sun is always there?	Find patterns in the way that the size of shadows change. (Investigation outside) Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Big Q - Are shadows always the same size and shape?	Find patterns in the way that the size of shadows change. (Write findings from last week) Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Big Q - Are shadows always the same size and shape?
Unit 2 Working Scientifically Rocks	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Classifying and presenting data in a variety of ways to help in answering questions. Using straightforward scientific evidence to answer questions or to support their findings.	Learn about igneous, metamorphic and sedimentary rock. Identify and classify Big Q - Which would make the best base rock?	Investigate igneous, metamorphic and sedimentary rock. What happens when you rub them together/ put them in water/magnify them. Can you see crystals in them? Etc. Big Q - Which would make the best base rock?	Learn about the process of fossilisation. Big Q - What do you see here?	Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Big Q - Are all rocks hard?	Recognise that soils are made from rock and organic matter. Big Q - Are all rocks hard?
Unit 3 Working Scientifically Forces and Magnets	Learn about friction. Compare how things move on different surfaces. Big Q - Why don't we do PE inside in our socks? Big Q - Why is it harder to drive on ice? Big Q - A world with no friction, would this be a good thing or a bad thing?	Learn about forces. Notice that some forces need contact between 2 objects. Big Q - Can objects move by themselves?	Friction investigation: Notice that some forces need contact between 2 objects. Big Q - Can objects move by themselves?	Preserving a banana skin/ tomato Set up experiment, write the method and predict. Setting up simple practical enquiries, comparative and fair tests.	Preserving a banana skin/ tomato Observe changes and note the changes. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. -	Preserving a banana skin/ tomato Observe the changes and note the results. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Using straightforward scientific evidence to answer questions or to support their findings.
Unit 4 Working Scientifically Forces and Magnets STEM	Describe magnets as having poles. Big Q - Are all metals magnetic? Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance.	If you were an engineer, what would you do?	Observe how magnets attract or repel each other and attract some materials and not others. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Big Q - What can you detect with a metal detector?	Predict whether 2 magnets will attract or repel each other, depending on which poles are facing. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Big Q - What will happen if we put the same poles together? Big Q - Which magnets will attract/repel?	Compare and group together a variety of everyday materials on the basis of whether they attract to a magnet, and identify some magnetic materials. Big Q - Are all metals magnetic?	Magnet investigation: Do magnets still work through other materials e.g. water, paper, card, glass, plastic, metal etc. Why could this be? Using straightforward scientific evidence to answer questions or to support their findings.
Unit 5 Working Scientifically Plants	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Big Q - Is a tree/plant alive?	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. Big Q - Can a plant survive without its leaves or roots?	Investigate the way in which water is transported within plants. Setting up simple practical enquiries, comparative and fair tests. Big Q - How does water move around a plant?	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. Big Q - I planted a tree...	Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Big Q - How do plants reproduce?	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. Big Q - The earth stops spinning...
Unit 6 Working Scientifically Animals including humans	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. Big Q - What do we need to live? Big Q - What would happen if we only ever ate sweets? Big Q - What would happen if we never did any exercise?	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Learn about the importance of skeletons. Big Q - What would happen if we didn't have a skeleton?	Identify humans and animal skeletons. Can they match the skeleton to the animal? How do they know? Identify vertebrates and invertebrates.	Identify that humans and some other animals have skeletons for support and protection. What do they protect? Big Q - You have a skeleton made from a flexible material. Would this be a good thing or a bad thing? Discuss.	Identify that humans and some other animals have muscles for movement. Big Q - What would happen if we had no muscles?	

Science - Units of Work



KS2

Year 4

Sequence of knowledge and skills

Unit 1 Working Scientifically States of Matter	<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Big Q - Are all rocks hard?</p>	<p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Big Q - Can a solid object ever change shape?</p>	<p>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. Setting up simple practical enquiries, comparative and fair tests.</p> <p>Big Q - Is water always a liquid?</p> <p>Big Q - The freezing point of water is now 10c. Is this good or bad?</p>	<p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Big Q - The ice caps melt...</p>	<p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>Big Q - Where does a puddle go?</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Big Q - Where does sugar go when it is dissolved in water?</p>
					<p>Big Q - Where does a puddle go?</p>	
Unit 2 Working Scientifically Electricity	<p>Identify common appliances that run on electricity.</p> <p>Big Q - Does everything need electricity to work?</p>	<p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>Big Q - Can electricity be dangerous?</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>Big Q - which circuit is the best?</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>Big Q - Does electricity only flow in one direction?</p>	<p>Recognise some common conductors and insulators.</p> <p>Big Q - Are all metals good conductors?</p> <p>Big Q - Why are insulators as important as conductors?</p>	<p>Associate metals with being good conductors.</p> <p>Big Q - If there is lightning, where is it safe to stand?</p> <p>Big Q - A world without electricity...</p>
Unit 3 Working Scientifically Living Things and Their Habitats	<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Big Q - Discuss the similarities and differences between these animals. Big Q - Only humans are left in the world..</p>		<p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Big Q - How do foxes live in the arctic and the desert?</p>		<p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Big Q - How can changes to the environment affect living things?</p> <p>Big Q - The earth stops spinning...</p>	
Unit 4 Working Scientifically Animals including humans STEM	<p>Identify the basic parts of the digestive system in humans.</p> <p>Big Q - Which is the biggest? Large or small intestine?</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Big Q - Do food and air go into your body the same way?</p>	<p>Identify the different types of teeth in humans and their simple function.</p> <p>Big Q - Why are teeth important?</p>	<p>Describe the different types of teeth in humans and their simple function.</p> <p>Big Q - Why visit the dentist?</p>	<p>Identify the differences between the teeth of herbivores and carnivores.</p>	<p>Discuss ways to look after your teeth and what can happen if you don't look after them.</p>
Unit 5 Working Scientifically Sound	<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Big Q - How do you make a sound?</p>	<p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Big Q - When you swim underwater, why can't you hear clearly?</p>	<p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Big Q - How do different objects make different sounds?</p>	<p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Big Q - How do ear defenders work?</p>	<p>Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>Big Q - If a tree falls in the forest, can it be heard?</p>	<p>Understand what a vacuum is and why no sound can travel.</p> <p>Big Q - Can a spaceman hear sounds in space?</p>
Unit 6 Animals including humans	<p>Understand the vocabulary producers/prey/ predators and their roles in the food chain.</p> <p>Big Q - What is a food chain?</p>	<p>Identify and label the producers, prey and predators in food chains.</p>	<p>Interpret a variety of food chains</p> <p>Big Q - Are all food chains the same?</p>	<p>Construct a variety of food chains</p> <p>Big Q - Do they always go in the same order?</p>	<p>Discuss what happens to a food chain if one of the producers/prey/predators are removed and the impact on the food chain and other animals.</p>	<p>Discuss the importance of every stage. Which stage is the most important? Why?</p> <p>Big Q - What would happen if one element of the food chain was removed?</p>

Science - Early Years Framework and Primary National Curriculum

This map shows the progression of Early Years and NC Objectives in Science.



Early Years		KS1		LKS2	
Nursery	Reception	Year 1	Year 2	Year 3	Year 4
ELG - Understanding the World	ELG - The Natural World	Working Scientifically	Working Scientifically	Working Scientifically	Working Scientifically
1. Explore the natural world around them, making observations and drawing pictures of animals and plants.	11. Explore the natural world around them, making observations and drawing pictures of animals and plants.	Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions.	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions.	Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. 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.	Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. 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.
2. 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.	2. 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.	Plants Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.	Living things and their habitats Explore and compare the differences between things that are living, dead and things that have never been alive.	Plants 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.	Living things and their habitats Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
3. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	3. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Animals, including humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores.	Animals, including humans Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)	Animals, including humans Identify that 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.	Animals, including humans 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.
Expressive Arts and Design	Expressive Arts and Design	Explore the natural world around them. Describe what they see, hear and feel whilst outside	Explore the natural world around them. Everyday Materials Distinguish between an object and the material from which it is made.	Plants Observe and describe how seeds and bulbs grow into mature plants Animals, including humans Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials.	Plants Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Animals, including humans Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Light Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces.
Little Chicks (birth to 3)		Explore materials with different properties. Explore natural materials, indoors and outside.	Find out and describe how plants needs water, light and a suitable temperature to grow and stay healthy	Animals, including humans Recognise that soils are made from rock and organic matter. Forces and magnets Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance.	Animals, including humans Identify that animals, including humans, have offspring which grow into adults Seasonal Changes Observe changes across the 4 seasons.
		Explore and respond to different natural phenomena in their setting and on trips.	Find out about and describe the basic needs of animals, including humans for survival (water, food and air)	Forces and magnets Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they attract to a magnet, and identify some magnetic materials.	Seasonal Changes Use of everyday materials Identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
Little Owls (3-4)		Understand the effect of changing seasons on the natural world around them.	Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.	Forces and magnets Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Describe magnets as having poles.	Use of everyday materials Identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
		Explore how things work.	Predict whether 2 magnets will attract or repel each other, depending on which poles are facing		Electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
		Provide mechanical equipment for children to play with and investigate.			Electricity 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.
		Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal.			Electricity Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
		Begin to understand the need to respect and care for the natural environment and all living things.			Electricity Recognise some common conductors and insulators, and associate metals with being good conductors.
		Explore and talk about different forces they can feel.			
		Talk about the differences between materials and changes they notice.			

Science - Key Vocabulary

This map shows the progression of vocabulary in Science. Tier 1 is every day language / Tier 2 is 'academic' language that can be used across subjects and themes / Tier 3 is subject specific



Learning Areas	Early Years		KS1		LKS2	
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4
Working Scientifically	Find out	Test	Identify and classify Record data Simple tests	Answer questions Observe Gather and record data	Practical enquiries (comparative and fair tests) Gather, record, present and classify data Report on findings using scientific language and understanding Draw conclusions Use scientific evidence Make predictions and suggest improvements	Using different types of scientific enquiry Make systematic and careful observation, accurate measurements using a range of equipment Record findings using scientific language, drawings, labelled diagrams, tables Present results and conclusions Identifying differences, similarities or changes in scientific ideas and processes.
Animals including humans	Zoos, food, frog, tadpole, fish, swan, duck, duckling, eggs, dinosaur	Bones, skeletons, growth, change, minibeasts, chicks	Amphibians, birds, fish, mammals, reptiles, carnivore, herbivore, omnivore, senses, sight, smell, taste, touch, hearing	Adult, develop, life cycle, offspring, reproduce, young, live young,	Healthy, nutrients, energy, saturated fats, unsaturated fats Vertebrate, invertebrate, muscles, tendons, joints	Digest, oesophagus, stomach, small/large intestine, rectum, herbivore, carnivore, omnivore, producer, predator, prey
Seasonal Changes	Hot, cold, weather	Seasons, spring, summer, winter, autumn	Natural, world, earth, daylight, weather, months			
Healthy Living				Dehydrate, diet, disease, energy, exercise, germs, heart rate, hygiene, nutri-	Healthy, nutrients, energy, saturated fats, unsaturated fats	
Plants	Plants, flowers, leaves, lily pad, seeds, bulbs,	Fruits, vegetables, bean-stalks	Wild plants, garden plants, weed, deciduous, evergreen, trees, roots, petals, stem, flowers, leaves, petals, fruit, seeds, bulb	Germination, sprout, shoot, seed dispersal, sunlight, water, temperature, nutrition	Roots, stem, leaves, flowers, nutrients, evaporation, fertilisation, petal, stamen, carpel, sepal, pollination, pollinator, germination, seed dispersal,	

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Learning Areas	Early Years		KS1		LKS2	
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4
Living Things and Their Habitats	Nest, pond	Nest, pond		Life processes, living, dead, never living, food chain, food sources, habitat, microhabitat, depend, survive		Organisms, life processes, respiration, sensitivity, reproduction, excretion, nutrition, habitat, environment, endangered, species, extinct, classification, vertebrates, invertebrates, specimen, char-
Materials	Triangle, square, straight, curved, side, ice	Strong, wood, metal, plastic, freezing, melting	Object, material, hard, soft, stretchy, shiny, dull, rough, smooth, bendy, waterproof, absorbent, transparent, opaque, paper, brick, fabric, stone	Materials, sustainability, properties John McAdam, Macadamisation (roads), John Dunlop (tyres), Charles McIntosh (waterproof material)	Forces and Magnets Forces, friction, surface, magnet, magnetic, magnetic field, poles, repel, attract	States of matter, solids, liquids, gases, water vapour, melt, freeze, evaporate, condense, precipitation
Light and Electricity					Light, light source, dark, reflection, reflect, reflective, ray, pupil, retina, shadow, opaque, transparent, translucent	Electricity, generate, renewable, non-renewable, appliances, battery, circuit, electrons
Rocks	rock	Rock, pebble, brick			Igneous, sedimentary, metamorphic, magma, lava, sediment, permeable, impermeable, fossilisation, palaeontology, erosion	
Sound						Sound, vibration, sound wave, volume, amplitude, pitch, ear, particles, distance, soundproof, absorb sound, vacuum, ear-drum

Science - Key Vocabulary



This map shows the progression of vocabulary in Science. Tier 1 is every day language / Tier 2 is 'academic' language that can be used across subjects and themes / Tier 3 is subject specific

Learning Areas	Early Years		KS1		LKS2	
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4
Working Scientifically	Working Scientifically	Working Scientifically	Working Scientifically	Working Scientifically	Working Scientifically	Working Scientifically
Animals including humans	Animals including humans	Animals including humans	Animals including humans	Animals including humans	Animals including humans	Animals including humans
Seasonal Changes	Seasonal Changes	Seasonal Changes	Seasonal Changes			
Healthy Living				Healthy Living	Healthy Living	
Plants	Plants	Plants	Plants	Plants	Plants	
Living Things and Their Habitats	Living Things and Their Habitats	Living Things and Their Habitats		Living Things and Their Habitats		Living Things and Their Habitats
Materials	Materials	Materials			Forces and Magnets	States of Matter
Light and Electricity					Light	Electricity
Rocks					Rocks	
Sound						Sound