



The Teaching of Science at Eskdale Academy

The teaching of science in Eskdale Academy fits in with our rationale and aims for our Whole School curriculum:

They include ensuring that the curriculum:

- Has the needs of the children at the heart of everything we do
- Is based on a strong foundation of oracy
- Meets the needs of our local community
- Is full of exciting, enriching and enjoyable learning experiences
- Provides opportunities for our children, staff and parents to all learn together.
- Positively improves academic outcomes
- Prepares our children to become positive role models in and effective contributors to Society
- Gives our pupils the chance to become the very best versions of themselves.

Or in short, a curriculum which provides only the very best education, opportunities and experiences for all of our pupils.

Vision for Science

At Eskdale Academy, the aim of science teaching is to provide the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We do not simply want children to learn scientific facts – we want them to alter their long term thinking relating to how science can be used to explain what is occurring and why it is happening. We want our children to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena as well as understand science is vital for our world's future prosperity.

We believe that science is a body of knowledge built up through experimental testing of ideas and provides a practical way of finding reliable answers to questions we may ask about the world around us. **We believe** science is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation and through scientific enquiry.

We aim to:

- 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
- equip pupils with the scientific knowledge required to understand the uses and implications of science, today and for the future.
- prepare our children for life in an increasingly scientific and technological world
- take an active role in taking care of our local and global environment.
- help develop and extend our children's scientific concept of the world.
- provide opportunities for all children to achieve their full potential.
- allow children the opportunity to raise their own scientific questions and also to experience different types of scientific enquiry, including practical activities and begin to recognise ways in which they might answer these.



Curriculum End Points

By the end of Key Stage One, we want ALL children to:

- experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them.
- be curious and ask questions about what they notice.
- develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.
- use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.
- learn about science through the use of first-hand practical experiences, combined with the use of some appropriate secondary sources, such as books, photographs and videos.
- Experience 'working scientifically' through all of the content below.
- read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Year Group	Topic	End Points
<p style="text-align: center;">Across KS1</p>	<p style="text-align: center;">Working Scientifically</p>	<p style="text-align: center;">Pupils should be taught about:</p> <ul style="list-style-type: none"> • 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. • gathering and recording data to help in answering questions.
	<p style="text-align: center;">Plants</p>	<ul style="list-style-type: none"> • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • identify and describe the basic structure of a variety of common flowering plants, including trees.
<p style="text-align: center;">YEAR 1</p>	<p style="text-align: center;">Animals, including humans</p>	<ul style="list-style-type: none"> • 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 Science. • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and



		<p>mammals, including pets).</p> <ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
	Everyday materials	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made. 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. compare and group together a variety of everyday materials on the basis of their simple physical properties.
	Seasonal changes	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies.
Year 2	Living things and their habitats	<ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive. 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. identify and name a variety of plants and animals in their habitats, including microhabitats. 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.
	Plants	<ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants. find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
	Animals, including humans	<ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air).



		<ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
	Uses of everyday materials	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

This will ensure all pupils are ready and able to access the Lower Key Stage 2 curriculum and beyond.

By the end of Lower Key Stage 2, we want ALL children to:

- broaden their scientific view of the world around them by exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions.
- ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.
- draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.
- Experience 'working scientifically' through all of the content below.
- read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Year Group	Topic	End Points
		Pupils should be taught about:



Year 3	Across LKS2	Working Scientifically	<ul style="list-style-type: none"> • 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. • identifying differences, similarities or changes related to simple scientific ideas and processes. • using straightforward scientific evidence to answer questions or to support their findings.
		Plants	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • 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. • investigate the way in which water is transported within plants. • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
		Animals, including humans	<ul style="list-style-type: none"> • 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



		<p>what they eat.</p> <ul style="list-style-type: none"> • identify that humans and some other animals have skeletons and muscles for support, protection and movement.
	Rocks	<ul style="list-style-type: none"> • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • describe in simple terms how fossils are formed when things that have lived are trapped within rock. • recognise that soils are made from rocks and organic matter.
	Light	<ul style="list-style-type: none"> • 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. • recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • recognise that shadows are formed when the light from a light source is blocked by an opaque object. • find patterns in the way that the size of shadows change.
	Forces and magnets	<ul style="list-style-type: none"> • compare how things move on different surfaces. • notice that some forces need contact between two objects, but magnetic forces can act at a distance. • 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 are attracted to a magnet, and identify some magnetic materials. • describe magnets as having two poles. • predict whether two magnets will attract or repel each other, depending on which poles are facing.
Y ea r 4	Living things and their habitats	<ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways.



		<ul style="list-style-type: none">• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.• recognise that environments can change and that this can sometimes pose dangers to living things.
	Animals, including humans	<ul style="list-style-type: none">• describe the simple functions of the basic parts of the digestive system in humans.• identify the different types of teeth in humans and their simple functions.• construct and interpret a variety of food chains, identifying producers, predators and prey.
	States of matter	<ul style="list-style-type: none">• compare and group materials together, according to whether they are solids, liquids or gases.• observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
	Sound	<ul style="list-style-type: none">• identify how sounds are made, associating some of them with something vibrating.• recognise that vibrations from sounds travel through a medium to the ear.• find patterns between the pitch of a sound and features of the object that produced it.• find patterns between the volume of a sound and the strength of the vibrations that produced it.• recognise that sounds get fainter as the distance from the sound source increases.
	Electricity	<ul style="list-style-type: none">• identify common appliances that run on electricity.• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs,



		<p>switches and buzzers.</p> <ul style="list-style-type: none"> • 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. • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • recognise some common conductors and insulators, and associate metals with being good conductors.
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This will ensure all pupils are ready and able to access the Upper Key Stage 2 curriculum and beyond.

By the end of Upper Key Stage 2, we want ALL children to:

- develop a deeper understanding of a wide range of scientific ideas and do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.
- encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.
- recognise that scientific ideas change and develop over time.
- select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.
- draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.
- Experience 'working scientifically' through all of the content below.
- read, spell and pronounce scientific vocabulary correctly.

Year Groups	Topic	End points
		Pupils should be taught about:



Across UKS2	Working Scientifically	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments.
Year 5	Living things and their habitats	<ul style="list-style-type: none"> • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals.
	Animals, including humans	<ul style="list-style-type: none"> • describe the changes as humans develop to old age.
	Properties and changes of materials	<ul style="list-style-type: none"> • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials,



		<p>including metals, wood and plastic</p> <ul style="list-style-type: none"> • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
	Earth and Space	<ul style="list-style-type: none"> • describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
	Forces	<ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Year 6	Living things and their habitats	<ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics.
	Animals, including humans	<ul style="list-style-type: none"> • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • describe the ways in which nutrients and water are transported within animals,



		including humans
	Evolution and inheritance	<ul style="list-style-type: none">• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
	Light	<ul style="list-style-type: none">• recognise that light appears to travel in straight lines• use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye• explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
	Electricity	<ul style="list-style-type: none">• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit• compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches• use recognised symbols when representing a simple circuit in a diagram.
<u>This will ensure all pupils are ready and able to access the Key Stage 3 curriculum and beyond.</u>		

Teaching of Science

Science is taught as part of our 'Core' Curriculum. Objectives are progressive and sequential; teaching children a vast knowledge of key scientific events and people; whilst developing a strong scientific vocabulary, an enquiring mind and skills to become a Scientist.



Topics are taught termly, with science objectives fully embedded within each area. The objectives being taught in each year group can be seen earlier in this document.

The school uses a variety of teaching and learning styles in science lessons. Our principal aim is to develop the children's knowledge, skills and understanding in science and we use a variety of teaching and learning styles in our science lessons. We believe in whole-class teaching methods and combine these with enquiry-based research activities. We believe children learn best when:

- They have access to, and are able to handle models/artefacts
- They go on visits to museums and places of interest
- They have access to secondary sources such as books and photographs
- Visitors talk about personal experiences of application of science in their jobs
- They listen to and interact with stories of key scientific moments/technological advancements
- They use drama and dance to act out key scientific concepts/events
- They are shown, or use independently, resources from the internet and videos
- They are able to use non-fiction books for research
- They are provided with opportunities to work independently or collaboratively, to ask as well as answer scientific questions.
- Science is combined with others subject areas (e.g. D&T/Computing/Maths) and further links are made/established.

We recognise the fact that we have children of differing ability in all our classes, and so we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this through a range of strategies which are differentiated by task, expected outcome and/or support from peers or adults

Recording of Science

Children each have an individual science book to record their work. Photographic evidence is collected from any practical investigations and this is uploaded onto our school website to share with the school community. In line with our oracy framework, teachers are encouraged to allow the children to present and record their findings in a variety of different ways (e.g. presentation)

Assessment of Science

In order to assess the children's knowledge in science, children will complete an end-of-unit assessment which will be evidenced in a children's science book. Teachers will also conduct observational assessments of children during lessons and assess verbal responses from children in line with our oracy framework. Teachers record attainment on a end-of-unit tracker.

Monitoring of Science

Monitoring takes place regularly through sampling children's work, lesson observations and importantly talking to the children – ensuring they enjoy each subject and can recall key knowledge of what they have been taught. Analysis of end-of-unit assessments combined with other evidence, provides a holistic of the quality of teaching and learning taking place in lessons.