



Science

Intent

At Blackford CofE Primary School, our children are **SCIENTISTS!** Our **intent** is to give every child a broad and balanced Science curriculum which enables them to confidently explore and discover what is around them, so that they have a deeper understanding of the world we live in. We want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with! To achieve this, it involves exciting, practical hands on experiences that encourage curiosity and questioning. Our aim is that these stimulating and challenging experiences help every child secure and extend their scientific knowledge and vocabulary, as well as promoting a love and thirst for learning. At Blackford CofE Primary School we have a coherently planned and sequenced curriculum which has been carefully designed and developed with the need of every child at the centre of what we do. We want to equip our children with not only the minimum statutory requirements of the science National Curriculum but to prepare them for the opportunities, responsibilities and experiences of later life.

Implementation:

At Blackford CofE Primary School, Science topics are taught within each year group in accordance with the National Curriculum on a two year cycle.

- Topics are blocked to allow children to focus on developing their knowledge and skills, studying each topic in depth.
- Every year group will build upon the learning from prior year groups therefore developing depth of understanding and progression of skills.
- Teachers promote enjoyment and foster interest of the scientific disciplines; Biology, Chemistry and Physics.
- Children explore, question, predict, plan, carry out investigations and observations as well as conclude their findings.
- Children present their findings and learning using science specific language, observations and diagrams.
- In order to support children in their ability to 'know more and remember more' there are regular opportunities to review the learning taken place in previous topics as well as previous lessons.
- At the start of each topic children will review previous learning and will have the opportunity to share what they already know about a current topic.



- Children are given a knowledge organiser at the start of each topic which details some key Science Curriculum Statement information, dates and vocabulary. This is not used as part of an assessment, but to support children with their acquisition of knowledge and are used as a reference document.
- Effective CPD and standardisation opportunities are available to staff to ensure high levels of confidence and knowledge are maintained.
- To support teaching, teachers access a range of resources and planning from CUSP.
- Effective use of education visits and visitors are planned, to enrich and enhance the pupil's learning experiences within the Science curriculum.
- Teachers use highly effective assessment for learning in each lesson to ensure misconceptions are highlighted and addressed.
- Effective modelling by teachers ensures that children are able to achieve their learning intention, with misconceptions addressed within it.
- Through using a range of assessment tools, differentiation is facilitated by teachers, to ensure that each pupil can access the Science curriculum.
- Children are given clear success criteria in order to achieve the learning intention with differing elements of independence.
- Pupils are regularly given the opportunity for self or peer assessment, which will then be used to inform planning, preparation, differentiation and address misconceptions within that lesson, or for the next lesson.
- Cross-curricular links are planned for, with other subjects such as Maths, English and Computing.

Impact:

The impact of this curriculum design will lead to outstanding progress over time, across key stages, relative to a child's individual starting point and their progression of skills. Children will therefore be expected to leave Blackford CofE Primary School reaching at least age related expectations for Science. Through various workshops, trips and interactions with experts our Science curriculum will lead pupils to be enthusiastic Science learners and understand that science has changed our lives and that it is vital to the world's future prosperity. We want to empower our children so they understand they have the capability to change the world. This is evidenced in a range of ways, including pupil voice, their work and their overwhelming enjoyment for science.

EYFS:

The Early Years Foundation Stage Curriculum supports children's understanding of Science through the planning and teaching of 'Understanding the World.' Children find out about objects, materials and living things using all of their senses looking at similarities, differences, patterns and change. Both the environment and skilled practitioners foster curiosity and encourage



explorative play, children are motivated to ask questions about why things happen and how things work. Our children are encouraged to use their natural environment around them to explore. Children enjoy spending time outdoors exploring mini-beasts and their habitats, observing the changing seasons, plants and animals. Children regularly participate in cookery and baking sessions which allows them to experience changes in state as ingredients are mixed, heated and cooled.

Year EYFS/ Y1	Year A (2024-25)		
	Year 1: Seasonal Change and Weather	Introducing Animals including humans	Introducing plants including trees
Knowledge	• knowing and explaining the order of seasons • knowing and explaining the changes within each season including months of the year • knowing different patterns of weather and explaining, for example, how rain can occur in all seasons • knowing that the earth rotates and explaining how day and night occurs	• knowing and explaining what an animal is and what a plant is • knowing and explaining how seasons influence plants and animals • knowing and identifying the common features of fish, amphibians, reptiles, birds and mammals • knowing, explaining and grouping animals by the types of food they eat • knowing and explaining the places (habitats) that fish, amphibians, reptiles, birds and mammals live • knowing and locating the main body parts of a human • knowing the five senses and explaining how they help compare different textures, sounds and smells	- knowing and identifying the basic structure of plants and trees, such as roots, bulbs, stem, leaf, flower, fruits, trunk, branch and crown • knowing and identifying the common names of wild and garden plants - knowing and identifying explaining different trees in the locality, such as oak or Scots Pine... - knowing and explaining the difference between evergreen and deciduous trees, including the influence of seasons
	Year B (2025-26)		
	Year 1: Introducing everyday materials	Revisit Animals including humans	Revisit plants including trees
	• knowing the properties of everyday materials, such as wood, plastic, glass, metal, water and rock • knowing and explaining the difference between an object and the material from which it is made, such as metal and a spoon • knowing and explaining the properties of materials, such as hard / soft, stretchy, / stiff, rough / smooth, bendy / rigid, waterproof / not	- knowing and explaining what an animal is and what a plant is • knowing and explaining how seasons influence plants and animals • knowing and identifying the common features of fish, amphibians, reptiles, birds and mammals • knowing, explaining and grouping animals by the types of food they eat	- knowing and identifying the basic structure of plants and trees, such as roots, bulbs, stem, leaf, flower, fruits, trunk, branch and crown • knowing and identifying the common names of wild and garden plants - knowing and identifying explaining different trees in the locality, such as oak or Scots Pine...

	waterproof, absorbent / not absorbent, opaque / translucent / transparent • knowing, explaining and grouping a range of everyday materials depending on their properties	• knowing and explaining the places (habitats) that fish, amphibians, reptiles, birds and mammals live • knowing and locating the main body parts of a human • knowing the five senses and explaining how they help compare different textures, sounds and smells	knowing and explaining the difference between evergreen and deciduous trees, including the influence of seasons
--	---	---	---

Year 2/3	Year A (2024-25)				
	Living things and Habitats (y2)	Animal Inc Humans (y3)	Everyday Materials (Y2)	Forces and Magnets (Y3)	Plants (Y2)
Knowledge	• knowing and explaining the common characteristic of living things, such as MRS GREN • knowing and explaining the difference between things that are living, dead and things that have never been alive • knowing and explaining what a habitat is and why plants and animals that live there are best suited to it • knowing and identifying a variety of plants and animals in micro-habitats and habitats • knowing and explaining what an animal is and how they get	• knowing and explaining that animals, including humans, need the right types and amounts of nutrition • knowing and explaining that animals only get nutrition from the food they eat – they cannot make their own food like plants • knowing, identifying and explaining the purpose and function of the human skeleton, such as supporting the body, protecting the lungs and helping joints move • knowing, identifying and explaining the purpose and function of the muscles,	• knowing and explaining what properties everyday materials have • knowing, comparing and explaining the properties and suitability of everyday materials for particular uses, such as glass in windows or bricks for building – identifying what is suitable or unsuitable • knowing and explaining how the shape of everyday materials can be changed, for example by squashing, bending, twisting and stretching • explaining how significant scientists have made useful	• knowing how objects move on different surfaces using friction and resistance to explain why • knowing and explaining the difference between contact and non-contact forces • knowing and explaining how magnets attract and repel each other • knowing and explaining how magnets attract some materials and not others • using what they know about the properties of materials from KS1 to group everyday materials that are attracted to a magnet	• knowing and explaining what conditions are needed for seeds to germinate and mature into plants • knowing and explaining how bulbs grow • knowing and explaining the conditions that plants need to thrive, grow, mature, and reproduce

	their food from other plants and animals • knowing and explaining what a simple food chain is, including the direction of energy	such as skeletal, cardiac or smooth muscles • knowing and explaining the difference between vertebrates and invertebrates	things from knowing about the properties of materials, such as Charles Macintosh	• knowing and identifying magnetic materials • knowing and explaining that a magnet has two poles, and predicting whether they will attract or repel each other	
Year B (2025-26)					
	Animals Inc Humans (Y2)	Rocks (Y3)	Light (Y3) Revising living things and Animals inc Humans (Y2)	Plants and Plants continued (Y3)	Revisit Rocks (y3)
	• knowing and explaining that animals, including humans, have offspring which grow into adults • knowing and explaining simple life cycles of animals, including humans # • knowing and explaining that animals need water, food and air to survive • knowing and explaining that to be healthy, humans need to exercise, eat the right amounts of different types of food and keep clean	• knowing and explaining that rocks can be grouped together on the basis of their appearance and properties • knowing and explaining how rocks are formed • knowing and explaining what a rock is and what is not a rock • knowing and explaining different types of rock, such as igneous, sedimentary and metamorphic rock • knowing and explaining how fossils of animals and plants are formed • knowing and explaining the different types of fossils, including body and trace fossil • knowing and explaining what soil is made from • knowing and explaining the different types of material that make up soil, including rocks and organic matter	• knowing and explaining that light is needed to see things • knowing and explaining that dark is the absence of light • knowing and explaining that light is reflected from surfaces and enters our eyes • knowing that the light of the sun can be dangerous and how to protect their eyes • knowing and explaining that shadows are formed when light from a source is blocked by an opaque object • knowing and explaining how shadows change size	• knowing and identifying the structure of the different parts of flowering plants • knowing and explaining the function of the parts of flowering plants • knowing and explaining what plants need to live and grow, such as air, light, water, nutrients from soil and space to grow • knowing how water is transported within plants and explaining the process of transpiration • knowing and explaining the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	• knowing and explaining that rocks can be grouped together on the basis of their appearance and properties • knowing and explaining how rocks are formed • knowing and explaining what a rock is and what is not a rock • knowing and explaining different types of rock, such as igneous, sedimentary and metamorphic rock • knowing and explaining how fossils of animals and plants are formed • knowing and explaining the different types of fossils, including body and trace fossil • knowing and explaining what soil is made from • knowing and explaining the different types of material that make up soil, including rocks and organic matter

Year 4/5/ 6	Year A (2024-25)					
	Living things and their habitats (Y5)	Komatsu (Climate Heroes)	States Of Matter (Y4)	Properties and changes of materials (Y5)	Animals Inc Humans (Y4)	Animals Inc Humans (Y6)
Knowledge	• knowing, identifying and explaining the differences in the life cycles of a mammal (dog), an amphibian (frog), an insect (ladybird) and a bird (chicken) • knowing and explaining the life process of reproduction in some plants and animals • knowing and explaining about a significant scientist, such as Maria Merion who David Attenborough described as one of the most important contributors to entomology	• The lessons include the topic of climate change – what it is, why it happens and how it affects us, along with how we can fight it. • Peatlands and other habitats are also covered, including endangered species and threats to their survival. • The culmination of the programme for students and teachers is a visit to the brand-new Komatsu Forest facility near Carlisle in Cumbria. For this final lesson, pupils spend the day at Komatsu, finding out what it's like to be in the forestry industry.	• knowing and explaining what matter and state means • being introduced to simple models that explain what particles are • knowing and explaining the difference between solids, liquids and gases, such as solids hold their shape, liquids form a pool not a pile and gases escape from an unsealed container • observing and knowing that some materials change state when they are heated or cooled, such as water evaporating or butter melting • knowing and using Celsius as a measure of temperature	• Knowing, identifying and grouping the properties of everyday materials, such as hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets • knowing and explaining how some materials dissolve in liquid to form a solution • knowing and describing how to recover a substance from a solution • knowing and using their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through	• knowing and identifying the parts of the human digestive system, such as the mouth, tongue, teeth, oesophagus, stomach, small and large intestine • knowing and explaining the functions of the parts of the human digestive system, such as the mouth, tongue, teeth, oesophagus, stomach, small and large intestine • knowing and explaining the different teeth that carnivores and herbivores have and why this is important for their diet • knowing, constructing and explaining food chains • knowing and identifying producers, predators and prey in a food chain	• knowing, describing and explaining the changes humans go through to old age • knowing and using a timeline to show stages of growth and development of humans, including puberty • knowing, comparing and explaining the difference in gestation periods of humans to other animals, such as an elephant or butterfly

			• knowing and explaining the part played by evaporation and condensation in the water cycle • observing, knowing and explaining how the rate of evaporation is associated with temperature	filtering, sieving and evaporating • knowing and explaining, by giving reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • knowing and explaining how dissolving, mixing and changes of state are reversible changes • knowing and explaining that some changes result in the formation of new materials that are not usually reversible, such as burning		
	Year B (2025-26)					
	Forces (Y5)	Forces Continued (Y5)	Earth and Space (Y5)	Evolution and Inheritance (Y6)	Animals Inc Humans (Y5)	
	• knowing and explaining that unsupported objects fall towards the Earth because of the force of gravity acting	• • knowing and explaining that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a	• knowing and identifying the eight planets in our solar system - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune	• knowing and explaining that living things have changed over time and that fossils provide information about living things that inhabited the	• knowing, identifying and explaining the main parts of the human circulatory system and describe the functions of the heart, such as lungs, heart,	

	between the Earth and the falling object • knowing, identifying and explaining the effects of air resistance, water resistance and friction, that act between moving surfaces, such as a parachute or a brake on a bike • knowing and explaining how significant scientists, such as Isaac Newton or Galileo Galilei helped develop the theory of gravitation • knowing, experiencing and explaining how the effect of friction on movement slows or stops moving objects	greater effect known as a force multiplier • knowing and experiencing how levers, pulleys and gears multiply a smaller force to achieve a greater effect, such as removing a nail using a claw hammer, making simple pulleys and gears on a bike	• knowing and identifying Pluto as a dwarf planet • knowing, identifying and explaining the movement of the Earth and other planets, relative to the Sun in the solar system • knowing and explaining the movement of the Moon relative to the Earth • knowing and explaining that a moon is a celestial body that orbits a planet, such as the Moon around Earth or the four large moons of Jupiter - Io, Europa, Ganymede and Callisto first seen by Galileo Galilei • knowing and explaining that the Sun, Earth and Moon are approximately spherical bodies • knowing about Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Earth millions of years ago, such as body fossils, mould fossils, cast fossils and trace fossils • knowing and explaining that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • knowing, identifying and explaining how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • knowing and explaining about significant scientists who have helped us understand the theory of evolution, such as Alfred Wallace and Charles Darwin	aorta, pulmonary vein, left atrium, right atrium, left ventricle, right ventricle, arteries, veins and capillaries, oxygenated and deoxygenated • knowing, identifying and explaining the components and function of blood, such as plasma, red blood cells, white blood cells, platelets, nutrients and oxygen • knowing and explaining the impact of diet, exercise, drugs and lifestyle on the way their bodies function • knowing, describing and explaining the ways in which nutrients and water are transported within animals, including humans • knowing and explaining how significant scientists helped us understand more about the circulatory system, such as Galen or William Harvey
	Year C (2026-27)				
	Living things and their habitats (Y4)	Living things and their habitats (Y6)	Light (Y6)	Electricity (Y4)	Electricity (Y6)
	• knowing and explaining that living things can be grouped in a variety of ways, such as vertebrate or invertebrate and flowering and non-flowering plants	• knowing and explaining how living things are classified into broad groups according to common observable characteristics and based on similarities and differences,	• knowing and explaining that light appears to travel in straight lines • knowing that light travels in straight lines to explain how objects are seen because they	• knowing and explaining that household appliances run on electricity from mains or batteries • knowing, identifying and explaining what a simple	• knowing and explaining how a single loop circuit (series circuit) works • knowing and explaining how the brightness of a lamp or the volume of a buzzer is

	• knowing, using and explaining the classification of vertebrates, such as fish, amphibians, reptiles, birds and mammals • knowing, using and explaining the classification of invertebrates, such as snails and slugs, worms, spiders and insects • knowing and use classification keys to group, identify and name a variety of living things in their local environment • knowing and explaining the impact on living things if their habitat changes	including micro-organisms, plants and animals • knowing and identifying the five major kingdoms of living things, including plant, animal, fungi, algae, slime and mould, and bacteria • knowing and explaining how significant scientists, such as Aristotle or Carl Linnaeus, helped us understand more about classification • knowing, using and explaining taxonomy • knowing and explaining reasons for classifying plants and animals based on specific characteristics, such as vertebrates or invertebrates • knowing and using classification systems and keys to identify some animals and plants in the immediate environment • knowing how to classify animals and plants they are unfamiliar with using a classification system	give out or reflect light into the eye • knowing and explaining that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • knowing that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	single loop circuit is (also known as a simple series electrical circuit) • knowing, identifying and explaining the component of a single loop circuit, such as cells, wires, bulbs, switches and buzzers • knowing and explaining 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 • knowing and explaining that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a single loop circuit • knowing and identifying that some common conductors and insulators as well as associating metals with being good conductors. • knowing and explaining that current is the flow of electricity through a circuit	affected by the number and voltage of cells used in a circuit • knowing, using and explaining the reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • knowing and using recognised symbols when representing a simple circuit in a diagram • knowing and explaining how to be safe when working with electricity
--	---	--	---	---	---