BISHOP LONSDALE CHURCH OF ENGLAND PRIMARY SCHOOL AND NURSERY

Science

Intent

At Bishop Lonsdale, we follow the National Curriculum for Science, and within that we aim to provide opportunities for our pupils to deepen their knowledge about significant concepts, methods, processes and uses of science. They will also learn to use and apply scientific skills, to observe and describe how things work, make predictions and explain why things happen. In doing so, they will be able to gain a better understanding of the world around them, appreciate the importance of evidence and the value of expertise, and describe events and phenomena in the world around them using accurate and precise vocabulary.

One of the key aims at Bishop Lonsdale is for all of our pupils, regardless of their background, to be successful and happy. Their learning in Science will aid them in this by allowing them to build up a store of powerful knowledge about scientific ideas and discoveries, to develop important scientific skills, and to understand how science is fundamental and useful to their everyday lives. All of these aspects will provide advantages when seeking careers and help support their aspirations, by raising their awareness of a wider range of opportunities for study or work in STEM fields in the future.

Implementation

Science is taught across all Key Stages at Bishop Lonsdale, introducing concepts and vocabulary in EYFS before moving on to more formal units of work in KS1 and KS2, which match to the National Curriculum. We use the Cornerstones curriculum as the basis for each unit of work, which provides high-quality lesson content and ensures comprehensive coverage and progression within the subject.

Early Years Foundation Stage

In EYFS, children will be developing the foundations of Science skills and knowledge both formally and informally, through structured activities and their continuous provision. This will include opportunities to use simple equipment such as timers, rulers and containers to measure length, height, capacity or time. With support, they will begin to work scientifically to observe, record and talk about materials and living things, and to offer explanations for how things work or why things happen, developing their use of vocabulary in doing so. They might represent scientific observations by mark-making, drawing or creating simple charts and tables to record simple data, and will be encouraged to ask their own scientific questions, then seek to find out more.

Key Stages 1 and 2

For Years 1-6, the teaching of Science in each year group is organised using the Cornerstones set of topics. This ensures that these statutory objectives for each year group in the National Curriculum programme of study for Science are covered:

Year 1

Programme of study:	**Pupils should be taught to:**
Plants	• 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.
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 • 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.
Everyday materials	• 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	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.

Year 2

Programme of study:	**Pupils should be taught to:**
Living things and their habitats	• 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 micro-habitats • 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	• 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	• 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) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
Uses of everyday materials	• 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.

Year 3

Programme of study:	**Pupils should be taught to:**
Plants	• 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	• 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 • identify that humans and some other animals have skeletons and muscles for support, protection and movement.
Rocks	• 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	• 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 sizes of shadows change.
Forces and magnets	• 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.

Year 4

Programme of study:	Pupils should be taught to:
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 • recognise that environments can change and that this can sometimes pose dangers to living things.
Animals, including humans	• 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	• 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	• 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	• identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • 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.

Year 5

Programme of study:	Pupils should be taught to:
Living things and their habitats	• 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	• describe the changes as humans develop to old age.

Properties and changes of materials	• 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, including metals, wood and plastic • 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	• 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	• 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

Programme of study:	**Pupils should be taught to:**
Living things and their habitats	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics.
Animals, including humans	• 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	• 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	• 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	• 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.

Impact

Through their learning in Science at Bishop Lonsdale, our pupils will have built up a store of powerful knowledge and cultural capital, which will include essential understanding of scientific ideas and discoveries that we experience directly in our everyday lives. They will have learned how to work scientifically and will be able to use and apply their scientific skills in a range of contexts, to support their aspirations and enable them to access a wider range of opportunities and careers in future.

Science also teaches our pupils the value of evidence and fairness. We want them to be able to make well-informed decisions and reach accurate conclusions, based on sound research, information and evidence. We want them to be able to ask big scientific questions and to evaluate the quality and accuracy of the answers they find. This is a hugely important skill in an increasingly online world of misinformation and opinions presented as facts.

In Science, our pupils will broaden their vocabulary, enabling them to make their thinking clear, engage in respectful discussions and articulate their understanding more accurately and precisely. They will have opportunities to develop their powers of rational explanation, so that in future they will be better placed to make decisions that support themselves and their communities.

Most of all, we want our pupils to develop a sense of excitement and curiosity about the world around them. Through making discoveries, sparking imaginative thoughts and considering their place in the universe, we want our pupils to think beyond themselves, to know that there is more to life, and that extraordinary things may be found within the ordinary. Our science curriculum will help to open doors and provide windows onto different experiences and careers for our pupils to pursue and enjoy in the future.