



**Intent:**

At Harbottle C of E First School it is our intention to recognise the importance of Science in every aspect of daily life. Science at Harbottle will develop the natural curiosity of our children and will encourage a Christian respect and guardianship for living organisms and the physical environment. We want to provide and enrich the children's scientific capital so that they may become active participants in the modern world. From this we hope to celebrate STEM subjects and highlight STEM careers, raising awareness for all children about the jobs they could do.

**Implementation:**

A clear and comprehensive scheme of work through Dual Action Planning, in line with the National Curriculum, where teaching and learning shows progression across all key stages within the strands of Science. Children will use a range of resources to develop their knowledge and understanding that is integral to their learning and develop their understanding of working scientifically; using practical equipment as much as possible. An on-going menu of additional learning opportunities in Science is offered and taught through collaboration with companies/organisations and outreach work, celebrating national STEM days/weeks and through our local community involvement. On-going feedback from pupils and staff will help focus and redirect the implementation of our Intent. This will make sure that all stakeholders are involved, engaged and that time and resources are used efficiently.

**Time Allocation**

Key Stage One - a one and a half hour lesson every week.

Key Stage Two - a two hour lesson every week.

Theme	Overview of topic	National curriculum links	Key vocabulary	Working scientifically
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Year A Scientists and Inventors	Short introduction of 3 - 4 weeks and an overview to Scientists and Inventors distinguishing between biology, chemistry and physics.		Scientist Inventor Investigate Experiment Data Record Observe	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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
Year A Seasonal change	Learn about the four seasons. The order of the seasons and the key features of each one.	Observe changes across the 4 seasons; Observe and describe weather associated with the seasons and how day length varies.	Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length, monsoon, khareef, thunder storm	
Year A Materials	Children will learn to identify everyday materials and their properties In particular: Wood, plastic, metal, water and rock  Discussions and investigations regarding the uses and suitability of materials for different tasks.	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.  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.	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through	
Year A Plants	Study plants and trees in the national environment. Plant seeds and bulbs	Pupils should be taught to: identify and name a variety of common wild and garden plants,	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem,	

	and compare them as they grow. Record the changes in plants in words and pictures.	including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees.  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.	bark, stalk, bud	
Year B Scientists and Inventors Biology, Chemistry, Physics 3-4 weeks				
Year B Animals including humans	Basic needs of all animals including humans. Keeping healthy, food and exercise	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;  describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets); identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.  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	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales,  Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)	

		importance for humans of exercise, eating the right amounts of different types of food, and hygiene.		
Year B Living things and their habitats	<p>Learn about a variety of habitats and the plants and animals that live there.</p> <p>Learn to tell the difference between things that are living, dead and things that have never been alive.</p> <p>Make observations of a local habitat and the creatures that live there, investigating conditions in local microhabitats and how they affect the minibeasts found within them.</p> <p>This unit allows children to research a range of global habitats and how the living things that live there are suited to their environments, and also provides an introduction to the idea of dependency between plant and animal species.</p>	<p>Pupils should be taught to: 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.</p>	<p>Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes</p>	
Year B The Environment	<p>Introduces children to the ecological challenges that face the modern world.</p> <p>Children undertake a range of activities that challenge them to engage with environmental issues and to understand the simple</p>	<p>Compare two different measurements. Draw a simple conclusion from the results of a test. Identify the material of an object. Suggest ways to reduce, reuse and recycle. Take a survey using a tally. Think of a way to teach people to use less energy.</p>	<p>Climate Environment Energy Sustainable Renewable Reduce Reuse Recycle</p>	

	<p>changes we can make to live more sustainable lives.</p> <p>Throughout the unit, learning is closely focused on the Working Scientifically strand of objectives, providing a range of opportunities for children to apply practical scientific methods and skills.</p>	<p>Communicate ideas to other people. Use different sources to find out answers to questions. Label the animal groups. Measure an amount of water in ml. Record the amount of water measured. Answer questions about an animal they have researched</p>		

<b>Theme</b>	<b>Overview of topic</b>	<b>National curriculum links</b>	<b>Key vocabulary</b>	<b>Working scientifically</b>
<b>Year A</b> Rocks	<p>Discover the different types of rocks and how they are formed. Compare and group rocks based on appearance and simple properties. Learn how fossils are formed and learn about the contribution of Mary Anning to the field of palaeontology. Understand how soil is formed and then investigate the permeability of different types of soil.</p>	<p>Pupils should be taught to: 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</p>	<p>.Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them</p> <p>setting up simple practical enquiries, comparative and fair tests</p>
<b>Year A</b> Forces and Magnets	<p>Forces, friction and magnetic attraction. Learn about forces in the context of pushing and pulling, and will identify different actions as pushes or pulls.</p>	<p>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</p>	<p>Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel,</p>	<p>making systematic and careful observations and, where appropriate, taking accurate</p>

	<p>Work scientifically and collaboratively to investigate friction, by exploring the movement of a toy car over different surfaces.</p> <p>Work in a hands on way to identify magnetic materials. Investigate the strength of different types of magnet.</p> <p>Explore the way magnetic poles can attract and repel in an exciting activity, making their own compass and using it to find hidden items.</p>	<p>other and attract some materials and not others</p> <p>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</p> <p>Describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p>magnetic material, metal, iron, steel, poles, north pole, south pole</p>	<p>measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <p>gathering, recording,</p> <p>classifying and presenting data in a variety of ways to help in answering questions</p>
<p><b>Year A</b> States of Matter</p>	<p>Differences between solids, liquids and gases, classifying objects and identifying their properties.</p> <p>Work scientifically and collaboratively to investigate the weight of a gas.</p> <p>Find the ideal temperature to melt chocolate.</p> <p>Explore in-depth how water changes state, exploring melting, freezing, condensing as well as a particular focus on evaporation. Learn about the stages of the water cycle.</p>	<p>Compare and group materials together, according to whether they are compare and group materials together, according to whether they are solids, liquids or gases</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 (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle</p>	<p>recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p>
<p><b>Year A</b> Plants and Pollination</p>	<p>Learn the names of different parts of plants, and the jobs they do. The children will work scientifically and collaboratively to investigate what plants need to grow well, and will present their findings to their classmates.</p> <p>Predict what will happen in an investigation into the transportation</p>	<p>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</p> <p>Investigate the way in which water is transported within plants explore the part</p>	<p>Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal</p>	<p>using results to draw simple conclusions, make</p>

	of water within plants. Identify the parts of a flower, and explore the different stages of the life cycle of a flowering plant.	that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.		predictions for new values, suggest improvements and raise further questions
<b>Year A</b> Living things and their habitats	Explore a variety of ways to identify, sort, group and classify living things. Learn how animals are split into 'vertebrates' and 'invertebrates' and begin to consider the differences between living things within these classifications. Use and create classification keys to group, identify and name living things from the local habitat and beyond. Learn about how environments are subject to human-made and natural changes, and that these changes can have a significant impact on living things.	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.	herbivore, carnivore, omnivore, producer, predator, prey, food chain	identifying differences, similarities or changes related to simple scientific ideas and processes  using straightforward scientific evidence to answer questions or to support their findings.
<b>Year B</b> Light and reflection	Light, reflections and shadows. Learn about different sources of light, and that we need light to see. Work scientifically and collaboratively to investigate reflective materials, in the context of designing a new book bag. Explore a range of mirror games, finding out more about reflective surfaces. Learn that the sun's light can be dangerous. Test which objects are opaque in an exciting investigation to design the most effective curtains, and will find out how shadows change when the distance between the object and	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.	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	

	light source changes. Develop their scientific enquiry skills, making observations, predictions and conclusions.			
Year B Sounds	<p>How vibrations cause sounds and how sounds travel,</p> <p>Sounds can change pitch and loudness.</p> <p>Learn about how sounds are made and carry out demonstrations of vibrations</p> <p>Complete a sound survey of their school. Work in groups to create a human model of the way particles pass sound vibrations on, explain how sound travels.</p> <p>Explore pitch, and will use their understanding of how high and low sounds Investigate how sounds change over distance and through different materials. The children will work scientifically and collaboratively to investigate the best material for soundproofing, in the context of making a music studio quieter.</p>	<p>Identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>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.</p>	<p>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation</p>	
Year B Electricity	<p>First introduction to studying electricity in Key Stage 2. Children will learn about what electricity is and how it was discovered. They will identify which appliances use electricity in their homes and how to keep themselves safe. Children will</p>	<p>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</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not</p>	<p>Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer,</p>	



	<p>construct circuits, start to create pictorial circuits and conduct an investigation into how easily different types of switches can break and reconnect a circuit.</p>	<p>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.</p>	<p>motor, conductor, insulator, metal, non-metal, symbol</p>	
<p>Year B  Animals including humans</p>	<p>How do animals survive and stay healthy?  What makes a healthy, balanced diet. Learn about the nutrients that different foods provide and how these nutrients help our bodies. Explore how different animals eat different types of foods and need different proportions of nutrients. Understand what food labels on packaging show and gather information from food labels to help them to answer questions. Children also explore the different types of skeletons that animals have and compare these. Learn names of bones in the human body  Discuss how to plan a fair test and measure and record accurately. Learn about how muscles help us to move and make a simple scientific model which they use to explain to a partner how skeletal muscles work. Learn about the digestive system in humans and animals and the functions of teeth. Learn more about herbivores, carnivores and omnivores</p>	<p>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.</p>	<p>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints</p> <p>Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars,</p>	

	in the context of teeth, digestion and the food chain. Extend understanding of food chains to more complex chains and food webs.			
Year B Science, Technology, Engineering and Maths Applying our knowledge to the wider world.				

**Skills progression in Working scientifically:**

	Designing experiments	Data, Tables and Graphs	Making Conclusions	Knowledge	Classification	Vocabulary
Reception	Rec Characteristics of Effective Learning Children should choose ways to do things. Plan and make decisions about how to approach a task and solve a problem, such as to how to reach a goal.	K and U- 40-60+ months, Enabling Environments Give opportunities to record findings by, e.g. drawing, writing, making a model or photographing. Provide stimuli and resources for	.K and U, Early Learning Goal Children make observations of animals and plants and explain why some things occur, and talk about. C and L: Speaking- 40-60+ months, I	K and U, Early Learning Goal Children know about similarities and differences in relation to places, objects, materials and living things	K and U, Early Learning Goal To look closely at similarities, differences, patterns and change	K and U, Early Learning Goal To talk about the features of their own immediate environment and how environments might vary from one another.

	Checking how well their activities are going. Changing strategy as needed. Reviewing how well the approach worked	children to create simple maps and plans, paintings, drawings and models of observations of known and imaginary landscapes.	can develop my own narrative and explanation by connecting ideas and events.	U the W Positive relationships, Adults use correct terms when naming things so that children can enjoy using them.		
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**Impact:**

Children are excited to take part and engage well with our Science lessons.

Most children will achieve age related expectations in Science at the end of their cohort year. Children will work collaboratively and practically to investigate and experiment. Children will be engaged and enthusiastic about STEM subjects, would consider/respect careers in STEM and appreciate that the STEM sector has the potential to shape our planet.