Science

Intent & Implementation
Science teaching at Wingrave gives all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and an understanding of the uses and implications of Science, today and for the future. Science is usually taught as a separate lesson but is also linked to each year groups topics where appropriate. We challenge and encourage our children to be curious as well as to develop and use a range of skills scientifically including observations, planning and investigations, encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Key scientific terminology will be introduced and the spiral curriculum allows children to build upon their prior knowledge and increase their enthusiasm for the topics whilst embedding this knowledge into the long-term memory. Children at Wingrave learn about plants, animals including humans, states of matter, materials and their uses, sound, electricity, earth and space and evolution and inheritance. The impact of our Science curriculum is that our children are equipped with the scientific skills and knowledge that will enable then to be ready for the secondary curriculum and for life as an adult in the world outside the classroom. Children will be able to demonstrate their ability to interpret scientific thinking and suggest ways in which they might explore a scientific principle.





Knowledge & Skills Progression							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking questions and carrying out fair and comparative tests	Beginning to understand 'why' and 'how' questions. Uses talk to organise, sequence and clarify thinking, ideas, feelings and events Answer how and why questions. Making links and noticing patterns in their experience Making predictions Testing their ideas	Asking simple questions and recognising that they can be answered in different ways. Performing simple tests children can: explore the world around them, leading them to ask some simple scientific questions about how and why things happen; begin to recognise ways in which they might answer scientific questions; ask people questions and use simple secondary sources to find answers; carry out simple practical tests, using simple equipment; experience different types of scientific enquiries, including practical activities; talk about the aim of scientific tests they are working on.		Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Children can: start to raise their own relevant questions about the world around them in response to a range of scientific experiences; start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a fair test is necessary; help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used; set up and carry out simple comparative and fair tests.		Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Using test results to make predictions to set up further comparative and fair tests. Children can: with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; explore and talk about their ideas, raising different kinds of scientific questions; ask their own questions about scientific phenomena; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them;

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Matthew 13:31-32

				plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary; use their test results to identify when further tests and observations may be needed; use test results to make predictions for further tests.
Observing and measuring changes	Checking how well their activities are going Changing strategy as needed Reviewing how well the approach worked	Observing closely, using simple equipment. Children can: observe the natural and humanly constructed world around them; observe changes over time; use simple measurements and equipment; make careful observations, sometimes using equipment to help them observe carefully.	Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Children can: make systematic and careful observations; observe changes over time; use a range of equipment, including thermometers and data loggers; ask their own questions about what they observe; where appropriate, take accurate measurements using standard units using a range of equipment.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Children can: choose the most appropriate equipment to make measurements and explain how to use it accurately; take measurements using a range of scientific equipment with increasing accuracy and precision; make careful and focused observations; know the importance of taking repeat readings and take repeat readings where appropriate.
Identifying, classifying, recording and presenting data	Developing ideas of grouping, sequences, cause and effect Planning, making decisions about how to approach a task, solve a problem and reach a goal	Identifying and classifying. Gathering and recording data to help in answering questions. Children can: use simple features to compare objects, materials and living things; decide how to sort and classify objects into simple groups with some help; record and communicate findings in a range of ways with support;	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. Children can: talk about criteria for grouping, sorting and classifying; group and classify things;	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Children can: independently group, classify and describe living things and materials; use and develop keys and other information records to identify, classify and describe living things and materials;

		sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.	collect data from their own observations and measurements; present data in a variety of ways to help in answering questions; use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.	decide how to record data from a choice of familiar approaches; record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.
Scientific enquiry	Beginning to understand 'why' and 'how' questions. Answer how and why questions. Making predictions Testing their ideas Developing ideas of grouping, sequences, cause and effect Planning, making decisions about how to approach a task, solve a problem and reach a goal Checking how well their activities are going	Ask simple questions and recognise they can be answered in different ways. Observe closely using equipment. Perform simple tests. Identifying and classifying. Use observations to suggest answers. Gather and record data.	Ask relevant questions and use different scientific enquiry to answer them. Set up simple practical enquiries, comparative and fair tests. Make systematic and careful observations. Take accurate measurements using equipment. Gather, record, classify and present data in a variety of ways.	Plan different types of scientific enquiries to answer, including recognising and controlling variables. Take measurements, using equipment, with increasing accuracy. Record data and results of increasing complexity using scientific vocab, drawings, labelled diagrams, keys, tables, scatter graphs and bar / line graphs.

Science Topics Covered over a Two Year Cycle							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn Cycle 1	**<u>All about me</u>** and **<u>Dinosaurs</u>** Can talk about some of the things they have observed such as plants, animals, natural and found objects. Talks about why things happen and how things work. Developing an understanding of growth, decay and changes over time. Shows care and concern for living things and the environment. Looks closely at similarities, differences, patterns and change	**<u>Seasonal Changes</u>** Observe changes across 4 seasons. Observe and describe weather associated with the seasons and how day length varies.		**<u>States of Matter</u>** 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.		**<u>Light</u>** 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. **<u>Electricity</u>** 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.	

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Autumn Cycle 2	**All about me** and **Superheroes** Can talk about some of the things they have observed such as plants, animals, natural and found objects. Talks about why things happen and how things work. Developing an understanding of growth, decay and changes over time. Shows care and concern for living things and the environment. Looks closely at similarities, differences, patterns and change	**Senses** Identify the 5 senses. Identify and recognise parts of body use for each sense. Describe each sense using scientific vocab.	**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.	**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.
Spring Cycle 1	**Space** Looks closely at similarities, differences, patterns and change Beginning to understand 'why' and 'how' questions. Uses talk to organise, sequence and clarify thinking, ideas, feelings and events.	**Everyday Materials** Distinguish between and object and material it is made from. Identify and name a variety of materials. Describe simple properties. Compare and group together materials based on simple properties. Identify and compare suitability of variety of materials Find out how the shapes of solid objects made from materials can be changed.	**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.	**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. **Living Things and Their Habitats** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

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				Describe the life process of reproduction in some plants and animals.
Spring Cycle 2	**Space** and **Around the World** Looks closely at similarities, differences, patterns and change Beginning to understand 'why' and 'how' questions. Uses talk to organise, sequence and clarify thinking, ideas, feelings and events. Answer how and why questions.	**Animals Including Humans** Identify and name common animals Identify and name carnivores, herbivores, omnivores. Describe and compare structure of animals. Identify and name basic parts of the human body. Notice that animals have offspring and they grow. Find out about the basic needs of animals for survival. Describe importance of food, exercise and hygiene.	**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 **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	**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.

			Find patterns in the way that the size of shadows change.	
Summer Cycle 1	**Pirates** and **Once Upon A Time** Similarities and differences between materials and living things. Observations of animals and plants. Explain why some things occur and talk about changes. Know that the environment and living things are influenced by human activity. Know the properties of some materials and can suggest some of the purposes that they are used. Familiar with basic scientific contexts such as floating, sinking and experimentation.	**Plants** Identify and name common wild and garden plants, including deciduous and evergreen trees. Identify and describe basic structure of common flowering plants, including trees. Observe and describe how seeds grow into plants Find out and describe how plants grow and stay healthy.	**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. **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.	**Animals Including Humans** Describe the changes as humans develop to old age.
Summer Cycle 2	**Down on the Farm** and **Awesome Authors** Similarities and differences	**Living things in their habitats** Explore and compare differences between things that are living, dead and never been alive. Identify most living things live in habitats and how their basic needs are provided.	**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	**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

	between materials and living things. Observations of animals and plants. Explain why some things occur and talk about changes. Know that the environment and living things are influenced by human activity. Know the properties of some materials and can suggest some of the purposes that they are used. Familiar with basic scientific contexts such as floating, sinking and experimentation.	Identify and name a variety of plants and animals in their habitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain.	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.	Describe the ways in which nutrients and water are transported within animals, including humans. **<u>Living Things and Their Habitats</u>** 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.