Subject Leader Report: Science

An effective science education provides the basis for understanding the world through biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity; that's why it is a core subject. Through building up a solid foundation of knowledge and concepts, pupils should be encouraged to recognise the power of reasoned explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to use science to explain what is occurring, predict how things will behave, and analyse causes.

The national curriculum for science aims to ensure that all pupils:

- 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
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

	Autumn Term	Spring Term	Summer Term
Year 3	Magnets and Forces Animals (including humans)	Parts of a Plant What a Plant Needs	Rocks and Soils (including fossils) Light and Shadows
Year 4	Dangers to Living Things Classifying Living Things	Changes of State Human Nutrition	Electricity Sound
Year 5	Earth and Space Forces	Materials Types of Change	Life Cycles
Year 6	Our Bodies Light and Sight	Classifying Living Things Electricity	Evolution and Inheritance

Pupil Guarantee

Science particularly links to our pupil guarantee, to ensure that every child finds their passion through developing a curiosity about the world around them, making healthy lifestyle choices, and extending their knowledge through visits and visitors.

Visits

ZooLab visited Year 6 – bringing spiders, snakes and frogs for pupils to handle as part of their study of the Rainforest

Year 5 had a visit from the space dome to explore the wonders of the universe

Year 4 explored the polar regions through workshops

Year 4, 5 and 6 visited Chesterfield to have some hands-on lab experience.

Science teachers from Chesterfield also visited us and gave the Year 3s a lesson to enhance their knowledge of rocks and soils.

British Values

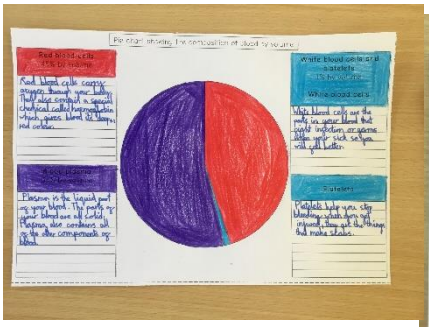
Science lessons are an ideal opportunity to reinforce British values. For example, when discussing their predictions or forming conclusions children must listen to each other's views and give them due consideration, showing mutual respect. Often they are working in groups and children have to show tolerance and respect towards each other, sharing equipment and taking turns.

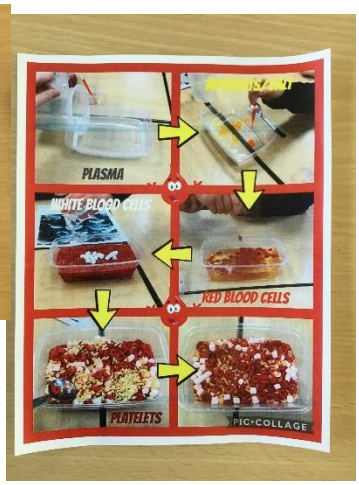
Book Moderation

Work in books continues to be of a high standard and presented in a variety of stimulating ways.

National curriculum coverage was a focus this year

and there was good coverage of the learning objectives in most year groups. After speaking with Year 6 teachers, we decided to re-write the plans for this year. I know year 6 have already enjoyed making 'blood' as part of these new plans.





Staff had CPD where resources were shared and planning was updated to ensure we had enough data/ graphs as part of lessons and some more learning about famous scientists so children could broaden their understanding as to how scientific ideas are developed.

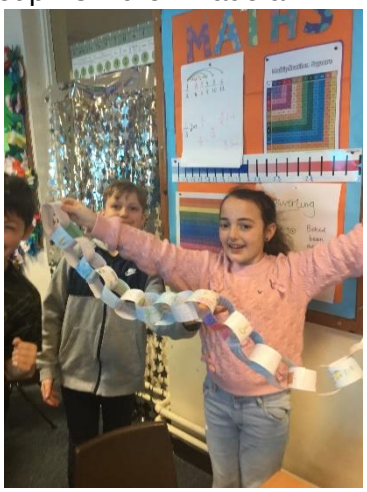
This year we will be doing a deep dive into science and focussing on coverage of working scientifically.

Science Club

Science Club was a great success again this year and I plan to continue with this. Children took part in different activities to make them excited about science and included STEM links. They got to use equipment like microscopes- which they loved!

Science Week

The Science Week theme this year was 'Connections' and children all had an assembly and science lessons based on this theme and a different topic was assigned to each year group. Children made a link in a chain and I joined them altogether to display in school. Winners were picked from each year group who received a science themed prize.



Progress: Last year's results across the school were

82% EXP (at age expectations)

15% EXC (exceeding age expectations)

		Year 3	Year 4	Year 5	Year 6
Working Scientifically		raise their own relevant questions about the world around them	raise their own relevant questions about the world around them	use their science experiences to explore ideas and raise different kinds of questions	use their science experiences to explore ideas and raise different kinds of questions
		should be given a range of scientific experiences including different types of science enquiries to answer questions	should be given a range of scientific experiences including different types of science enquiries to answer questions	talk about how scientific ideas have developed over time	talk about how scientific ideas have developed over time
		start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	select and plan the most appropriate type of scientific enquiry to use to answer scientific questions	select and plan the most appropriate type of scientific enquiry to use to answer scientific questions
		Set up simple practical enquiries, comparative and fair tests recognise when a simple fair test is necessary and help to decide how to set it up	Set up simple practical enquiries, comparative and fair tests recognise when a simple fair test is necessary and help to decide how to set it up	recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why	recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why
		talk about criteria for grouping, sorting and classifying; and use simple keys	talk about criteria for grouping, sorting and classifying; and use simple keys	use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment	use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
		recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact	recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact
		make systematic and careful observations help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	make systematic and careful observations help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	make their own decisions about what observations to make, what measurements to use and how long to make them for	make their own decisions about what observations to make, what measurements to use and how long to make them for
		begin to look for patterns and decide what data to collect to identify them	begin to look for patterns and decide what data to collect to identify them	look for different causal relationships in their data and identify evidence that	look for different causal relationships in their data and identify

				refutes or supports their ideas	evidence that refutes or supports their ideas
		take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately	take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately	choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately	choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately
		collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, and bar and line graphs	decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, and bar and line graphs
		with help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.	with help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.	identify scientific evidence that has been used to support or refute ideas or arguments	identify scientific evidence that has been used to support or refute ideas or arguments
		use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions	use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions	use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of results use simple models to describe scientific ideas	use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of results use simple models to describe scientific ideas
		with support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	with support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	use their results to make predictions and identify when further observations, comparative and fair tests might be needed	use their results to make predictions and identify when further observations, comparative and fair tests might be needed

Biology	Animals Inc Humans	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • describe the changes as humans develop to old age.	**Pupils should be taught to:** • 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.
	Plants	**Pupils should be taught to:** • 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.			

	Living Things and Their Habitat		**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.
	Evolution and Inheritance				**Pupils should be taught to:** • 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.

Chemistry	Materials	Rocks **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.	States of Matter **Pupils should be taught to:** • 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.	Properties and Changes of Materials **Pupils should be taught to:** • 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.	
Physics	Forces and Magnets	**Pupils should be taught to:** • compare how things move on different surfaces; • notice that some forces need contact between 2 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 2 poles; • predict whether 2 magnets will attract or repel each other, depending on which poles are facing.		**Pupils should be taught to:** • 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.	

	Light	**Pupils should be taught to:** • 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.			**Pupils should be taught to:** • 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.
	Sound		**Pupils should be taught to:** **• 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.**		
	Earth and Space			**Pupils should be taught to:** **• 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.**	
	Electricity		**Pupils should be taught to:** • 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		**Pupils should be taught to:** • 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;

			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.		• use recognised symbols when representing a simple circuit in a diagram.