



Science



Statement of Intent for Science

Science should inspire curiosity in our pupils and nurture a desire to question, explore and understand the world around them. It should help them to develop concise and accurate explanations, give them the ability to test scenarios and encourage critical thinking. To recognise that to fail is part of the scientific process and that from this comes more opportunities to investigate. These are vital skills which will support our children with whatever they want to pursue later in life. The science National Curriculum identifies three key areas in which the children should be taught: knowledge and understanding; working scientifically and the application of science.

Why do we teach it the way we do?

Our school has a science curriculum that ensures children, from reception to year 6, cover these three aims in an accessible, creative and engaging way. We believe that children learn science best by doing and seeing; by providing the children with a range of opportunities to actively carry out different types of scientific enquiries, we ensure that by working scientifically and applying the knowledge gained, is embedded within the science curriculum.

Implementation

What do we teach? What does this look like?

The science curriculum follows the year by year progression of knowledge and skills as set out in the National Curriculum and our skills progression grids. We believe that for the children to become scientists, they not only need knowledge, but also the skills to work scientifically and opportunities for skills and knowledge to be applied.

Key ideas (and misconceptions) are included within the curriculum planning; these promote discussion, challenge thinking and ensure the full coverage of all five types of scientific enquiry. The 5Cs: *Consider, Collect, Carry-out, Compare, Conclude*

Assessment is via end of unit tests based on content taught as well as teacher assessments against the skills progression grids.

Impact

What will this look like?

By the time children leave our school they will:

We want children to enjoy and value science and appreciate the range of skills it will provide them with. An essential part of the children becoming scientists is promoting curiosity and encouraging the children to ask questions.

- Our expectation is that children will be able to develop their own questions, plan different types of enquiries to answer those questions and communicate their findings in a variety of ways.
- Children will understand that part of science is failing and that problem solving helps us to overcome these failures.
- Children will have a clear understanding of how scientists both past and present have contributed to society's understanding of the world around them.
- They will understand the role that science and other STEM subjects play in solving some of the key problems facing the world, such as climate change.

Pupils are provided with a range of opportunities to showcase and communicate their ideas, research and findings.

Teachers use a variety of assessment tools, including: pre and post learning unit tasks, pupil discussions about their learning and scrutiny of books by the subject leader to check for progress.

Progress of our science curriculum is demonstrated through outcomes and the record of coverage in the process of achieving these outcomes.

“We know good science happens in our school when...”

1. We are excited by and understand the importance of science.
2. We see ourselves as scientists - we ask questions, make observations, experience, discover and develop new skills.
3. We get to be creative, curious and understand the need for us to develop a caring and responsible attitude for the wider world.
4. We can make connections between what we have learnt in science to other topics.
5. We can apply our knowledge, vocabulary and skills to solve a range of problems and questions both in and out of the classroom.
6. We are encouraged and given time to share our ideas and findings and to learn from our mistakes.
7. Our lessons are engaging and carefully sequenced to allow us all to have the opportunity to achieve and make progress in science.

EYFS links to NC Science

Science			
Development matters links	Early Learning Goals	How this is achieved in EYFS	
3 /4 year olds: <u>Communication & Language(CL)</u> links: - Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" <u>Physical Development (PD):</u> - Be increasingly independent in meeting their own care needs, e.g. brushing teeth, using the toilet, washing and drying their hands thoroughly. - Make healthy choices about food, drink, activity and toothbrushing. <u>Mathematics (M):</u> - Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...' <u>Understanding of the world (UW)</u> - Use all their senses in hands-on exploration of natural materials.	(End of Reception Assessment point) <u>Communication & Language links:</u> - Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. <u>Personal Social and Emotional Development:</u> - Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. <u>UW: The Natural World</u> - Explore the natural world around them, making observations and drawing pictures of animals and plants. - Know some similarities and differences between the natural world	Over their time in Pre - School <u>Autumn Term:</u> Marvellous Me – - Learning about their bodies and finding features for themselves through stories and rhymes. (heads shoulders knees and toes, eyes, ears, nose and mouth) - Learning about their senses and what they do. Link to stories and what they hear, see and feel. - Explore different textures of things in their environment outdoor and indoor. - Make connections between features of their families and those of others and they talk about who they live with and people who are special to them. - Learn about ways to keep their bodies healthy and learn about oral hygiene and why it is so important to keep our teeth healthy. - Focus on building more independence in how children manage their own personal hygiene (washing hands, going to the toilet, eating) Celebrations, Stories and Rhyme Time– - Begin to look for changes in the season and notice what happens in the environment in Autumn / winter. - Exploring shadows through dark and light. <u>Spring Term:</u>	Reception <u>Autumn Term:</u> - Identify and name basic body parts - Discuss how they can keep their bodies clean and healthy - Investigate personal hygiene and germs - Explore the importance of brushing their teeth, foods that impact our teeth and the role of the dentist - Explore the natural world around the outdoor area - Use senses, describe what they see, hear and feel outside - Learn how our food goes from seed to harvest - Investigate Autumn – identifying differences and changes over time in the weather, animals and plants - Explore different animal habitats - Learn about the physical features of different animals - Learn about nocturnal animals and their habitats - Explore ways they can show care/concern for animals in their environment – how can we care for animals in the winter? <u>Spring Term:</u> - Describe their local habitat and how it compares to another country. What are the similarities and differences? - Investigate Winter – identifying differences and changes over time in the weather, animals and plants - Explore the signs of winter

• Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice. <u>Reception</u> <u>CL links:</u> • Use talk to help work out problems and organise thinking and activities explain how things work and why they might happen. • Learn new vocabulary <u>PD:</u> • Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, sensible amounts of 'screen time', having a good sleep routine, being a safe pedestrian	around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter	Amazing Animals – • Explore Winter – exploring signs of winter in the environment and using their senses to explore the cold and ice/frost. • Talk about the world around them and compare it to an environment around the world, linked to animals and stories (Handa's Surprise, Dear Zoo) • Learn about the different habitats of animals (compare habitats eg farm, jungle, safari) • Find out about other countries in the world and how others live (eg Handa's surprise). On the Move – • Explore how things work and how things move (toys with moving mechanisms, beebots, other toys and resources that they can make move- indoor and outdoor) • Learn about different vehicles and ways of travelling (by foot, car, plane, train, bus). • Explore different forces and talk about what they can feel eg using movement with cars, magnets and explore boats on water. • Begin to explore maps and handle maps in play. Explore how to identify key, familiar features on maps. <u>Summer Term:</u> Down in the Garden – • Learn about the life cycle of a bean. Children to plant a bean and observe the changes that occur over time. • Begin to learn about what plants need to grow, can they look after the plants in	• Use senses to describe what they see, hear and feel outside • Explore different states of matter (i.e. ice melting/freezing) • Compare the environments and animals of the Arctic and Antarctica • Investigate Spring – identifying differences and changes over time in the weather, animals and plants • Compare Autumn/Winter/Spring and their changes and differences • Learn about the life cycle of plants – observe the changes over time • Explore plant and flower care <u>Summer Term:</u> • Investigate and compare prehistoric insects and other extinct minibeasts to minibeasts today • Examine minibeasts and their habitats • Identify minibeasts based on their characteristics • Identify features that make a creature an insect • Observe and document the life cycle of caterpillars • Review how to care for living things (animals and plants) • Observe the growing cycle of plants • Explore space (planets, the moon, stars) • Introduce students to the problem of pollution in the oceans • Explore how people keep the oceans clean • Brainstorm ideas for how people could keep oceans clean in the future • Research what rubbish can do to our environment and animals • Identify ways to recycle in everyday life • Create opportunities to discuss how we care for the natural world around us • Explore floating and sinking
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<u>UW</u> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.		their own outdoor environment? Look at caring for plants and living things. • Explore different • Learn about homes/habitats of creatures in our environment. Children will go on minibeast hunts and explore what they can see, feel and hear outside. • Learn about different creatures/minibeasts and features to identify them with a focus on how to care for them. • Learn about the life cycle of a frog and explore first-hand the changes that happen over time (frog spawn observation station if applicable). Dream Big: People Who Help Us (transitions) – • Learn about the roles of others in our local environment and how they help them. • Look again at oral hygiene and how we can look after our teeth. Visit from a dentist.	• Students test, evaluate and improve their boat-making ideas based on the properties of sinking and floating
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Vocabulary over the year in EYFS (this is not an exhaustive list)						
Pre - School	Autumn 1: Marvellous Me	Autumn 2: Celebrations, Stories and Rhyme Time	Spring 1: Amazing Animals	Spring 2: On the Move	Summer 1: Down in the Garden	Summer 2: Dream Big – People Who Help Us
	Body, head, shoulders, knees, arms, legs, feet, toes, eyes, ears, mouth, nose	Shadows, shine, light, dark, ice, melting, heavy, light, lumpy, smooth, more than, faster,	Animals, homes, live, farm, zoo, safari, jungle, stripes, patterns, spots	Push, pull, wheels, fly, drive, Heavy, light, lightest, bouncy, bumpy, whizzes, speed, scoops, lifts, floats,	Grow, bean, shoot, change, stalk, leaves Sun, water, rain, soil, plant	Teeth, clean, healthy, dentist, brush, toothpaste

	Teeth, clean, healthy, dentist	quietly, Autumn changes	Winter, ice, melt	fast, slow, up and down, hurries, rushes, balance, hunt, wavey, deep, dark forest, snow storm	Life cycle, frog, tadpoles, change, grow Caterpillar, bugs, legs, wings,	
Reception	Autumn 1: Magnificent Me	Autumn 2: Let's Celebrate!	Spring 1: Our Wonderful World	Spring 2: Once Upon a Story	Summer 1: Minibeasts	Summer 2: Amazing Adventures!
	Body, hip, thigh, elbow, head, neck, leg, arm, hand, feet, skeleton, Family, changes, baby, toddler, child, adult	Owl – sharp beak, sharp talons, wing, prey, predator Hedgehog, hoglet, nocturnal, hibernate, spines/spikes, protect, defend	Winter, ice, frost, melt, frozen Antarctica, Arctic, iceberg, ice, frozen, winds, blizzard Animals – Penguins, Emperor Penguin, life cycle, egg, chick, fledgling, feathers, waterproof, flippers, blubber, huddle Polar bear, Arctic fox, Arctic hare, Arctic owl, seal, orca, camouflage, fur,	Growing, plants, life cycle, roots, seed, bulbs, stem, petals, bud, flower Healthy eating – vegetables, fruits, diet, body, exercise, sleep, routine	Life cycle, egg, caterpillar, changes, metamorphosis, chrysalis, painted lady butterfly Spiders, arachnid, eight legs, two body parts, webs, spinnerets, eggs Snails, mucus, foot, shell, moist, radula (for eating), eyes, two long tentacles, two short tentacles Habitat, dark, damp, moist,	Space, moon, phases, stars, gases, sun Sea, ocean, sea creatures, rock pool Plastic pollution, recycle, reuse Float, sink, boats
	Seasons revisited over the year – Autumn, winter, spring, summer, changes					

Year 1 – Science			
	Autumn Stomp, Chomp, Roar	Spring Once Upon a Town	Summer Oh I Do Like to be Beside the Seaside
Key Questions	What are our 5 senses and why do we need them? What is an animal? What are the creatures that live on earth? What are the different animal groups? What is a herbivore and carnivore? What are the different seasons and what is the weather like at different times in the year? What is the purpose of the different parts of a tree? Can we find deciduous and evergreen trees in our school grounds? Why don't the leaves fall from all of the trees in autumn?	Plants: What do plants need to grow? Can we name and group some common trees and plants? How can we grow our own Beanstalk? Materials: What materials are different objects made from? Can we describe materials and their properties? What is the best material to build a wolf proof house from?	What are the names of different materials we use? What are the properties of different materials? What are the similarities/ differences between each material? What materials have been used to make different objects? What is the difference between an object name and its material Which material would we use to make ____ and why?

National Curriculum	Pupils will be able to: identify and name a variety of common wild and garden plants, including deciduous and evergreen trees 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 observe changes across the 4 seasons	Pupils will be able to: identify and describe the basic structure of a variety of common flowering plants, including trees Identify and name a variety of common wild and garden plants,	Pupils will be able to: 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
Skills Grid	Seasonal Changes Observe changes across the four seasons including weather and how day length varies. Working Scientifically (Planning) Ask questions based on exploration of the world around them. Respond to prompts by making some suggestions about how to find an answer. Working Scientifically (Observation and Recording)	Working Scientifically (Planning) Ask questions based on exploration of the world around them. Respond to prompts by making some suggestions about how to find an answer. Working Scientifically (Observation and Recording)	Everyday Materials Distinguish between an object and the material from which it is made. Identify and name some everyday materials including wood, plastic, glass, metal, water, brick, paper, fabric and rock. Begin to discuss the best materials for making items e.g. umbrellas, house,

	Respond to prompts by making some suggestions about how to make an observation Use senses and simple equipment to make observations, talking about what is happening and recording observations using words and/or pictures. Begin to record data in simple templates. Begin to identify and classify data and information Working Scientifically (Conclusions) Begin to draw conclusions by comparing objects, materials and living things. Identify changes that have occurred when observing objects, living things or seasons Begin to predict based on own experiences Plants Identify and name a range of <u>deciduous and evergreen trees.</u> Identify and describe the basic structure of plants, <u>including trees</u> (using scientific names: root, stem, leaves, trunk, branches, fruit and crown). Animals including Humans Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Respond to prompts by making some suggestions about how to make an observation Use senses and simple equipment to make observations, talking about what is happening and recording observations using words and/or pictures Begin to record data in simple templates. Begin to identify and classify data and information Working Scientifically (Conclusions) Begin to draw conclusions by comparing objects, materials and living things. Identify changes that have occurred when observing objects, living things or seasons Begin to predict based on own experiences Plants Identify and name a range of common wild and garden plants. Identify and describe the basic structure of plants, (using scientific names: root, stem, leaves, petals, flower, trunk, branches, fruit, bulb and seed).	discussing the essential physical properties the material needs. Use scientific language to describe the simple physical properties of a variety of everyday materials and compare and group based on their physical properties Working Scientifically (Planning) Ask questions based on exploration of the world around them. Respond to prompts by making some suggestions about how to find an answer. Working Scientifically (Observation and Recording) Respond to prompts by making some suggestions about how to make an observation Use senses and simple equipment to make observations, talking about what is happening and recording observations using words and/or pictures. Begin to record data in simple templates. Begin to identify and classify data and information Working Scientifically (Conclusions) Begin to draw conclusions by comparing objects, materials and living things.
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	- Identify, name and describe a variety of common animals including fish, amphibians, reptiles, birds and mammals. - Identify and name a variety of animals that are, carnivores, herbivores and omnivores. - Describe the link between an animal's diet and their type of teeth. - Describe and compare the structure of common animals such as birds, fish, reptiles, amphibians and mammals (including pets). Living things and their habitats Begin to discuss the habitats of some common animals including mammals, reptiles, fish, birds and amphibians.			Observe and discuss the growth of plants (including vegetables) they have planted.			Identify changes that have occurred when observing objects, living things or seasons Begin to predict based on own experiences Seasonal Changes Observe changes across the four seasons including weather and how day length varies.		
Key Vocabulary	<u>Humans</u> sight, taste, smell, touch, hear, Body parts such as head, shoulders, nose, elbow, leg, arm, chin Organs-heart, lungs, spine etc	<u>Animals:</u> Herbivore Carnivore Omnivore Cold blooded, warm blooded, camouflage, scales, gills,	<u>Trees-</u> Spring, summer, autumn, winter, seasons Parts of a tree: roots, stem, truck, branches, crown, leaves, fruit, flowers	Plants, beans, soil, water, sunlight, wild plants, common plants,	experiment, investigation, prediction,	leaf, petal, stalk roots, pod, germinate, spout, shoot, pollination, flower	materials wood metal glass plastic water rock brick paper	fabric elastic hard soft stretchy stiff shiny dull rough	smooth bendy not bendy waterproof absorbent opaque transparent translucent

			Deciduous, evergreen						
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Year 2 – Science			
	Autumn Victorians	Spring Lost in London	Summer Eco Warriors
Key Questions			
National Curriculum	<u>Animals, including humans</u> 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.	<u>Materials</u> 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.	<u>Living things and their habitats</u> 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. <u>Plants</u> 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.
Skills Grid	<u>Animals including humans</u> Identify animals, including humans, have offspring that will grow into adults, Find out about the basic needs of animals including humans and what they need to survive (air, food and water). Describe the importance for humans of exercise, a balanced diet and hygiene, including how to look after teeth.	<u>Materials</u> Identify and compare the suitability of a variety of everyday materials including wood, plastics, glass, metal, water and rock. Talk about what common materials are used for, e.g. glass for windows and why this is best material to use. Investigate how shapes of solid materials can be changed by squashing, bending, twisting and stretching. <u>Working scientifically (planning)</u> Ask simple questions and recognise that they can be answered in different ways.	<u>Plants</u> Observe and describe how seeds and bulbs grow into mature plants. Find out about and describe what plants need to grow and stay healthy, including water, light and temperature and how this slightly differs from seeds and bulbs (who mostly do not need light to start germinating). <u>Animals including humans</u> Describe and compare features of living, dead and non-living things and recognise that living things grow and reproduce.

		Use simple secondary sources to find answers. Talk about similarities and differences. <u>Working scientifically (recording and observing)</u> Undertake a simple test, following instructions given. Use senses and simple equipment to make observations, talking about what is happening and recording using words. Identify and classify data and information based on criteria (flammable and not flammable). <u>Working scientifically (conclusions)</u> Talk about describe and sort simple similarities and differences, noting patterns and relationships. Record and communicate findings in a range of ways using simple scientific language. Talk about what has been found out and how it was discovered. Talk in simple scientific terms about what might happen and why? (prediction)	Identify most living things live in habitats that they are suited to and describe how different habitats provide the basics needs for different animals and plants to survive. 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 simple food chains. <u>Working scientifically (planning)</u> Ask simple questions and recognise that they can be answered in different ways. Use simple secondary sources to find answers. Talk about similarities and differences. <u>Working scientifically (recording and observing)</u> Undertake a simple test, following instructions given. Use senses and simple equipment to make observations, talking about what is happening and recording using words. Identify and classify data and information based on criteria (flammable and not flammable).
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			Record data using pictograms, tally charts, block diagrams and simple tables Take accurate measurements using simple equipment, e.g. cm and scales with one interval. <u>Working scientifically (conclusions)</u> Talk about describe and sort simple similarities and differences, noting patterns and relationships. Record and communicate findings in a range of ways using simple scientific language. Talk about what has been found out and how it was discovered. Talk in simple scientific terms about what might happen and why? (prediction)
Vocabulary			

Year 3 – Science			
	Autumn Savage Stone Age	Spring Romans – Veni, Vidi, Vici!	Summer Rainforest Rangers
Key Questions	<u>Rocks and Soils:</u> Lesson 1: Hook Children will learn about Skara Brae, inside and outside, and how it was different to the shelters that would have been made by hunters and gatherers. Children will learn about how people in Britain started to settle. Children will complete a labelling activity of the interior of Skara Brae and what each part was used for. https://www.youtube.com/watch?v=1pvJ9_Q88Y0 Lesson 2: How can we sort rocks? Children will work in groups to sort rocks dependant on different factors; Light or heavy? Does it contain crystals? Does it have layers? Does it float or sink? Is it smooth or gritty? Colour?	<u>Forces & Magnets:</u> Link to D & T with teams making a chariot with specific features like the chassis, axle and wheels. How do things move? What is friction and when is it useful? How do magnets work?	<u>Plants:</u> What are the parts of a plant and what are their functions? What do plants need to grow well? What is the life cycle of a plant? How is water transported in a plant? (<i>Green planet</i>) <u>Light:</u> What are shadows and how are they formed? How does light reflect? What can humans do to stay safe from the sun? (<i>Link to canopy of rainforest</i>) <u>Zoologists:</u> <u>Animals including Humans</u> How do skeletons and muscles provide support and protection? How do animals move? (<i>Deadly 60</i>) Who do these bones belong to?

	Children will record their observations in a table. Can they guess what type of rock each one is using their observations to help them? Lesson 3: What rocks are permeable? Children will complete a science experiment observing which rocks are permeable and impermeable. Children will make a prediction before completing the experiment and will record all observations in a table. Photographs to be taken. Lesson 4: What rocks are permeable? (Conclusion) Children will decide what rocks would be best for the roof of the model after analysing their results. Children will write up what they have found out. Lesson 5: What rocks are durable? Children will complete a science experiment observing which rocks are durable. Children will make a prediction before completing the experiment and will record all observations in a table. Photographs to be taken. Lesson 6: What rocks are durable? (Conclusion) Children will decide what rocks would be best for the roof of the model after analysing their results. Children will write up what they have found out. Lesson 7/8: Children will write their findings in a letter to St Fagans		Why do we need a skeleton? What are the different types of skeleton? What is a muscle? What do muscles help us do? How can we make sure we look after our bodies? What does a balanced diet look like?
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	explaining their findings. Assessment Part 2 to be completed.		
National Curriculum	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 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	Science: compare how things move on different surfaces notice that some forces need contact between 2 objects, but magnetic forces can act at a distance	Animals including Humans continued 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 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 Light

	Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing		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
Skills Grid	<u>Working Scientifically</u> Set up simple practical enquiries. Begin to make decisions about what to observe and the length of time to observe. Talk about criteria for grouping, sorting and classifying, use simple keys. Record data using bar charts and tables. Talk about data collected from observations and measurements, using drawings, labelled diagrams, notes, simple tables and keys.	<u>Working Scientifically</u> <u>Planning:</u> Respond to suggestions of how to answer questions about the world around them and ask effective and relevant questions. Recognise when and how secondary sources should be used. Discuss the most appropriate type of scientific enquiry to use to answer questions. Recognise that questions can be answered in different ways <u>Working Scientifically</u> <u>Observation & Recording:</u> Set up simple practical enquiries.	<u>Working Scientifically:</u> Begin to identify new questions arising from data, make new predictions for new values within or beyond the data collected. <u>Computing:</u> Collect information and present it to someone else. <u>Plants:</u> Identify and describe the functions of different parts of flowering plants including the: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water,

	Begin to draw and express some conclusions, by looking at changes, patterns, similarities and differences in data. <u>Materials</u> Compare and group different kinds of rocks based on appearance and simple physical properties. Describe how fossils are formed when things that have lived were trapped within rock. Recognise that soils are made from rocks and organic matter.	Begin to make decisions about what to observe and the length of time to observe. Read simple scales and take accurate measurements using standard units, e.g. Thermometers, beakers & data loggers. Talk about criteria for grouping, sorting and classifying, use simple keys. Record data using bar charts and tables. <u>Working Scientifically</u> <u>Conclusions:</u> Begin to look for patterns and decide what data to collect to identify them. Talk about data collected from observations and measurements, using drawings, labelled diagrams, notes, simple tables and keys. Begin to draw and express some conclusions, by looking at changes, patterns, similarities and differences in data. Begin to identify new questions arising from data, make new predictions for new values within or beyond the data collected. <u>Forces & Magnets:</u> Compare how things move on different surfaces. Describe situations where friction is helpful and where it is not, Identify the effects of friction acting between moving surfaces. Describe magnets as having two poles	nutrients from soil and room to grow) and how these vary from plant to plant and the way in which water is transported in plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Describe using accurate scientific vocabulary the features of a plant, such as the function of a stamen. <u>Animals (including humans):</u> Identify and describe simple features of human and other animal skeletons, and how muscles are used for support, protection and movement. Describe in simple terms the changes that take place as animals grow. (link to PSHE) Identify that animals including humans need the right types and amount of nutrition and that they cannot make their own food, that they need nutrition from what they eat. <u>Light:</u> Recognise that light is needed to see things and that dark is the absence of light. Recognise that shadows are formed when light from a light source is blocked by a solid object.
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		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. Predict whether two magnets will attract or repel each other depending on which poles are facing.	Notice that light is reflected from surfaces. Recognise that light from the sun is dangerous and that there are ways to protect the eyes. Find patterns in the way that the size of shadows changes.
Vocabulary	Rocks Rocks, minerals, classification, type, durable, permeable, impermeable, soft, hard, gritty, smooth, layers, crystals, light, heavy, prediction, conclusion, experiment, Skara Brae. Formed, metamorphic, sedimentary, igneous, pressure, lava, volcano, fossils, layers, soil, organic matter, bedrock, subsoil, topsoil.	Forces, friction, high friction (grip), low friction (slip), push, pull, poles, attract, repel, north, south,	Plants Plant, Stamen, Stem, Roots, leaves, Flower, petals, seeds, dispersion, pollination, adaption, purpose, job, life cycle, adaption, water, Animals (including humans): <i>skull, cranium, jawbone (mandible), scapula (shoulder blade), humerus, radius, ulna, tibia (shin bone), fibula, rib cage, carpals, metacarpals, phalanges, patella, tarsals, metatarsals.</i>

Year 4 – Science			
	Autumn Tomb Raiders	Spring Secrets of the Saxons	Summer Extreme Earth
Key Questions	Living things and their habitats How can living things be grouped/classified in different ways? Animals including humans What is the journey of food through our bodies?	Animals including humans What can we learn about an animal's diet by looking at their teeth? Sound How are sounds made? Can I design an Anglo-Saxon inspired musical instrument that makes different sounds?	Electricity What is electricity? Where does it come from? How do I make a simple circuit? What are insulators and conductors? States of Matter What are all things made from? How does matter behave in different states? Can you change the states of matter?
National Curriculum	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 the 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	Animals, including 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. • 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 produce it • Find patterns between the volume of a sound and the strength of the vibrations that produce it • Recognise that sounds get fainter as the distance from the sound source increases. Sound	Electricity - Working Scientifically • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • 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 • reporting on findings from enquiries, including oral and written explanations,

		• 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 produce it • Find patterns between the volume of a sound and the strength of the vibrations that produce it • Recognise that sounds get fainter as the distance from the sound source increases.	displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. States of Matter - Working Scientifically • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • 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 • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
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			• identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. 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
Skills Grid	Working scientifically (observation and recording) • Gather, record, classify and present data in a variety of ways to help answer questions. • Use and construct increasingly complex tables, line graphs and keys to record findings. Living things and their habitats • Describe features of plants and animal and compare similarities and differences between sub-groups, recognising that all living things can be grouped in different ways. • Explore and use classification keys to help to group, identify and name a variety of living things in the local and wider environment. Animals including humans	Science (working scientifically - Planning) • Raise own relevant questions and use different types of scientific enquiry to answer questions. Animals, including 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 • Represent feeding relationships as food chains and webs including primary, secondary and tertiary consumers. • Compare the teeth of carnivores, herbivores and omnivores; suggesting reasons for their differences. Find out what can damage teeth and how we can look after them.	Working Scientifically - Planning • Make decisions about the most appropriate type of scientific enquiry to answer questions. • Recognise and identify the factors needed to make a test 'fair'. • Identify the factors in a simple 'fair' test that we will measure (variables) and keep the same (control). Working Scientifically - Observation & Recording • Set up simple practical enquiries, comparative and fair tests. • Make decisions about what to observe, how long to observe for, and the type of equipment needed. Working Scientifically – Conclusions of data needed to identify them. • Collect data from observations and measurements, using notes, simple tables and standard units, using drawings, labelled diagrams, keys, bar charts and tables.

	Describe the simple functions of the basic parts of the digestive system in humans	Sound Science (working scientifically - Planning) • Raise own relevant questions and use different types of scientific enquiry to answer questions. • Recognise and identify the factors needed to make a test 'fair'. • Identify the factors in a simple 'fair' test that we will measure (variables) and keep the same (control). Science (working scientifically – observing and recording) • Make decisions about what to observe, how long to observe for, and the type of equipment needed. Science (working scientifically – evaluation) • Look for patterns and decide on the range of data needed to identify them. • Collect data from observations and measurements, using notes, simple tables and standard units, using drawings, labelled diagrams, keys, bar charts and tables. • Identify changes, patterns, similarities and differences in data in order to draw conclusions. • Suggest improvements and identify new questions arising from data, make new predictions for new values within or beyond the data collected. • Report on findings from enquiries including oral and written explanations.	• Identify changes, patterns, similarities and differences in data in order to draw conclusions. • Suggest improvements and identify new questions arising from data, make new predictions for new values within or beyond the data collected. • Report on findings from enquiries including oral and written explanations. Electricity • Explain how a circuit works and recognise that a switch opens and closes a circuit and how this will affect whether a lamp will light or not. • Describe why a bulb won't light and identify the problem within the circuit. • Construct and record a simple series circuit, and name its basic parts, including cells, wires, bulbs, switches and buzzers. • Draw a simple series circuit. • Identify common appliances that run on electricity. • Recognise common conductors and insulators and associate metals with being good conductors. • Identify some dangers associated with electricity and discuss how to keep safe. States of Matter - Working Scientifically - Planning • Make decisions about the most appropriate type of scientific enquiry to answer questions. • Recognise and identify the factors needed to make a test 'fair'. • Identify the factors in a simple 'fair' test that we will measure (variables) and keep the same (control). Working Scientifically -
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			Observation & Recording • Setup simple practical enquiries, comparative and fair tests. • Make decisions about what to observe, how long to observe for, and the type of equipment needed. • Make systematic and accurate observations and measurements using a range of measuring equipment appropriately including thermometers, data loggers etc. • Gather, record, classify and present data in a variety of ways to help answer questions. Working Scientifically – Conclusions of data needed to identify them. • Collect data from observations and measurements, using notes, simple tables and standard units, using drawings, labelled diagrams, keys, bar charts and tables. • Identify changes, patterns, similarities and differences in data in order to draw conclusions. • Suggest improvements and identify new questions arising from data, make new predictions for new values within or beyond the data collected. • Report on findings from enquiries including oral and written explanations. Materials – including states of matter • Compare and group materials according to their state of matter. • Observe how some materials change state when heated or cooled and begin to research the temperature of materials in degrees Celsius.
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			• Identify a range of simple reversible and irreversible changes through heating and cooling. • Develop a secure understanding of the water cycle and the important roles of evaporation and condensation, associating the rate of evaporation with the temperature,
Vocabulary	Living things and their habitats Mammals, birds, amphibians, reptiles, fish, classification, grouping, keys, characteristics, features Animals including humans saliva, oesophagus, stomach, small intestine, rectum, anus, liver, gallbladder, pancreas, breaking down of food	Animals, including humans Incisors, canines, premolars, molars, wisdom teeth, diet, Herbivore, Carnivore, Omnivore, Food chain, producer, consumers, predator, prey, primary consumer, secondary consumer Sound Pitch, volume, instrument, Lyre, vibrations, patterns, source	Electricity Electrons, circuit, open and closed circuits, switch, bulb, bulb holder, cell, battery, battery holder, lightning, positive, negative, electrons, wires, crocodile clips. States of Matter Matter, atoms, states of matter, evaporation, condensation, cooling, freezing, heating, reversible, irreversible, temperature, deg

Year 5 - Science			
	Autumn It's all Greek to me!	Spring We have Lift Off!	Summer Roses, Rivers, Religion
Key Questions	Forces What is gravity and how does it affect life on Earth? What are mechanisms and how do they help us? How can air resistance slow a parachute down?	Materials How are materials classified by their properties? How do different materials behave? Earth and Science What makes up our solar system? Are the sun, moon and Earth spherical? How does the movement of the moon affect day and night?	Habitats What is a mammal? How do life cycles differ between mammals, reptiles, birds and insects?
National Curriculum	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 Properties and changes of materials Pupils should be taught to:	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	Living things and their habitats 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 Animals, including humans Pupils should be taught to: describe the changes as humans develop to old age

	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		
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Skills Grid	Identify and give reasons why materials are used for a specific task or purpose. Compare and group everyday materials based on evidence from comparative and fair tests, based on hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. Demonstrate that dissolving, mixing and changes of state are reversible changes. 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. 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 vinegar (acid) on bicarbonate of soda. Describe in detail the properties of liquids, solids and gases. <u>Forces</u>	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. Find out how ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.	Describe the changes that take place as humans develop from birth to old age. Learn about the changes that take place during puberty. Draw a timeline to indicate stages in the growth and development of humans. 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. Use scientific vocabulary to describe life processes, e.g. respiration in animals, pollination in flowering plants etc. Learn about the work of naturalists and/or animal behaviourists e.g. David Attenborough or Jane Goodall. Find out about different types of reproduction, including sexual and asexual reproduction in plants and sexual production in animals
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	Recognise that unsupported objects fall to 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. Recognise that when an object is at rest the forces are balanced. Recognise that weight is a force and is measured in Newtons. Use a Force meter accurately. Find out about how Galileo Galilei and Isaac Newton helped develop the theory of gravitation		
Vocabulary			

Year 6 - Science			
	Autumn Friend or Foe	Spring Inspirational Inventors	Summer Around the World in 80 Days
Key Questions	<u>Light</u> What are light sources? What is a natural source of light and what is a reflector of light? How do we see? How do periscopes work? Can we create our own to help the allies win the Battle of the Atlantic?	<u>Animals including humans</u> What are the different components of blood and what is the function of each of these? What is the circulation system? What parts of the body make up the circulation system and what is the function of each of these? How does blood travel around the circulation system? What does the human heart look like? What are the different parts of the human heart? How does blood travel around the heart? <u>Electricity</u> How does voltage/ number of cells affect a lightbulb, buzzer or motor in a circuit? What are the symbols used for electrical components? Can we identify them?	Living Things & Their Habitats & Evolution and Inheritance Focus: Who is Carl Linneaus and how has his classification system shaped classification? How can we categorise/classify living things? How have living things changed over time? How have animals/living things adapted to their environment?
National Curriculum	Recognise and explain how light appears to travel in straight lines. Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that casts them. Use knowledge of how light travels to explain the formation of shadows. Use the idea that light travels in straight lines to explain that	<u>Animals including humans</u> 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.	<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. <u>Evolution and Inheritance</u>

	objects can be seen because they give out or reflect light into the eye. Explain that things are seen because light travels from light sources to the eye or from light sources to objects and then to the eye. Explore ideas and raise a range of relevant questions based on accurate scientific principles. Make independent and well-funded decisions about what to observe. Use relevant scientific language and illustrations to discuss scientific ideas.	<u>Working scientifically (Animals including humans)</u> Choose the most appropriate equipment (with a variety of intervals and units) to make measurements and explain how to use accurately and with precision, taking repeat readings when necessary. Gather, record, classify and present data in a wide range of ways. Use a wide range of methods to record data including bar charts. <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 Explain scientifically what happens if you change the number of bulbs. use recognised symbols when representing a simple circuit in a diagram <u>Working scientifically (electricity)</u> • Label diagrams using appropriate scientific symbols.	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. <u>Working scientifically (Living things and their habitats)</u> Explore ideas and raise a range of relevant questions based on accurate scientific principles. Gather, record, classify and present data in a wide range of ways. Use a wide range of methods to record data including classification keys. Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas. <u>Working scientifically (Evolution and Inheritance)</u> Explore ideas and raise a range of relevant questions based on accurate scientific principles. Plan different types of enquiries to answer questions and put measures in place to ensure accuracy and reliability.
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		Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas.	Decide which variables to measure, change or keep the same. Select the most suitable variables to be investigated. Recognise when and how to set up comparative and fair tests and clearly explain which variables need to be controlled and why. Gather, record, classify and present data in a wide range of ways. Decide in detail how to record data accurately from a choice of familiar approaches. Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas. Look for a range of different relationships in data and begin to identify evidence that refutes or supports ideas, challenging the conclusions of others. • Identify when tests need to be repeated in order to obtain reliable results. • Make increasingly measured statements .
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Skills Grid	● Recognise and explain how light appears to travel in straight lines. ● Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that casts them. Use knowledge of how light travels to explain the formation of shadows. ● Use the idea that light travels in straight lines to explain that objects can be seen because they give out or reflect light into the eye. Explain that things are seen because light travels from light sources to the eye or from light sources to objects and then to the eye.	<u>Animals including humans</u> ● 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. <u>Working scientifically (Animals including humans)</u> ● Choose the most appropriate equipment (with a variety of intervals and units) to make measurements and explain how to use accurately and with precision, taking repeat readings when necessary. ● Gather, record, classify and present data in a wide range of ways. ● Use a wide range of methods to record data including bar charts. <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 ● Explain scientifically what happens if you change the number of bulbs. ● use recognised symbols when representing a simple circuit in a diagram ● Create a useful circuit e.g. a game.	<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. ● Learn about Carl Linnaeus, a pioneer of classification. <u>Evolution and Inheritance</u> ● 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. ● Learn about the work of scientists such as Charles Darwin and how they developed their ideas on evolution. ● Learn about paleontologists such as Mary Anning to discover how fossils provide us with information. <u>Working scientifically (Living things and their habitats)</u> ● Explore ideas and raise a range of relevant questions based on accurate scientific principles. ● Gather, record, classify and present data in a wide range of ways. ● Use a wide range of methods to record data including classification keys.
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		<u>Working scientifically (electricity)</u> • Label diagrams using appropriate scientific symbols. Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas.	• Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas. <u>Working scientifically (Evolution and Inheritance)</u> • Explore ideas and raise a range of relevant questions based on accurate scientific principles. • Plan different types of enquiries to answer questions and put measures in place to ensure accuracy and reliability. • Decide which variables to measure, change or keep the same. • Select the most suitable variables to be investigated. • Recognise when and how to set up comparative and fair tests and clearly explain which variables need to be controlled and why. • Gather, record, classify and present data in a wide range of ways. • Decide in detail how to record data accurately from a choice of familiar approaches. • Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas. • Look for a range of different relationships in data and begin to identify evidence that refutes or supports ideas, challenging the conclusions of others. • Identify when tests need to be repeated in order to obtain reliable results. • Make increasingly measured statements .
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Vocabulary		<u>Human Biologists</u> Blood, components, plasma, red blood cells, white blood cells, platelets, haemoglobin, blood vessels, veins, arteries, capillaries, heart, superior vena cava, pulmonary arteries/veins, aorta, atrium/atria, ventricles, valves, muscle, heart rate, oxygenated, deoxygenated. <u>Electricity</u> Components, circuit, increased, decreased, lightbulb, buzzer, wires, batteries, cells, motor, switch, open switch, closed switch, appliances, complete/incomplete circuit, conductors, insulators, current, flow, electrons, volts, voltage.	
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