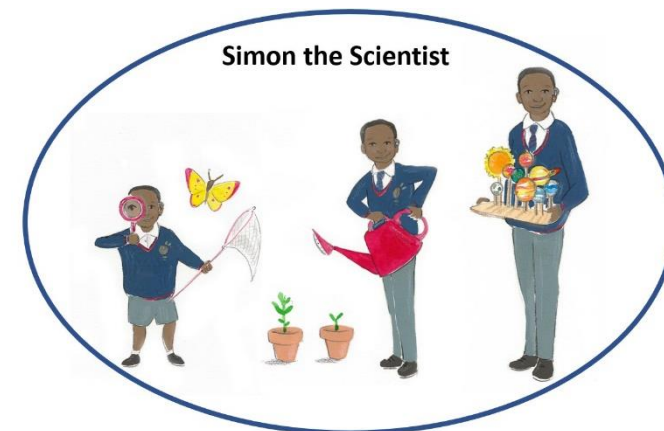


Science

Long Term Curriculum Map

Whole School Scheme of Learning



Intent: Why does our Science curriculum look like this?

At Barley Fields Primary, we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in Primary Schools, we give the teaching and learning of Science the prominence it requires. Our teaching of Science is concerned with increasing children's knowledge and understanding of our world and with developing skills associated with Science as a process of enquiry. We aim to develop children's natural curiosity, encourage respect for living organisms and the physical environment and provide opportunities for evaluating and explaining evidence.

At Barley Fields Primary, in conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- 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;
- Be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.
- Develop the essential scientific enquiry skills to deepen their scientific knowledge.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

At Barley Fields Primary, we aim to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically. We plan our teaching themes around the three scientific disciplines; Biology, Chemistry and Physics. We want children to gain an understanding of scientific processes and an awareness of the uses and implications of Science, today and for the future.

Implementation: How will we achieve this?

Our children follow a carefully structured Science curriculum which is designed to ensure children know more, do more and remember more as they progress through school. Scientific enquiry skills are embedded into each topic and these are enhanced, revisited and developed throughout their time in school. Our teaching approach allows children to build upon their prior knowledge and increase their enthusiasm for Science whilst embedding knowledge into the long-term memory. All children are encouraged to

develop and use a range of Scientific skills including making observations, planning and completing investigations, as well as being encouraged to ask questions about the world around them.

Our Teaching Approach:

Science is taught in blocks of lessons to ensure children have opportunities for a sustained period of study and have time to embed and enhance their learning. We have developed detailed medium-term planning which supports teaching, ensures continuity and carefully plans for progression and depth. This medium-term planning also underpins appropriate teaching pedagogy for effective quality first teaching in Science and ensures learning is practical and hands on. Specialist vocabulary linked to our Science topics is taught and built up, and effective questioning encouraged. Concepts are reinforced by focusing on the key features of scientific enquiry, so that children learn to use a variety of approaches to answer relevant scientific questions.

Our children understand the core skills they need to learn in Science with the use of the school curriculum character – Simon the Scientist. This character is regularly used to encourage children to reflect on the key skills, attitudes and knowledge needed when learning across the Science curriculum.


Early Years
Simon the Scientist
Natural World

- ✓ I enjoy exploring the world around me.
- ✓ I draw and write about things I have seen.
- ✓ I can talk about some important processes and changes in the natural world around me, including the seasons.




KS1
Simon the Scientist

- ✓ I enjoy working like a scientist.
- ✓ I ask questions to find out how things work or why things happen.
- ✓ I enjoy planning investigations and can make simple predictions about what might happen or change.
- ✓ I watch carefully and talk about what I have seen.
- ✓ I can draw and write about what I have seen.
- ✓ I can explain why and how things happen.



KS2
Simon the Scientist

- ✓ I enjoy working like a scientist.
- ✓ I can create questions to investigate.
- ✓ I like to plan and carry out different types of investigation fairly.
- ✓ I can gather information in different ways.
- ✓ I am good at observing and recording my results using diagrams, tables and graphs.
- ✓ I can explain why and how things happen using my scientific knowledge.



Impact: How will we know that our children are achieving?






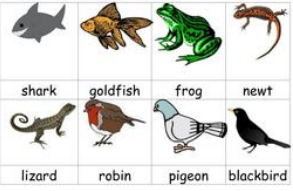




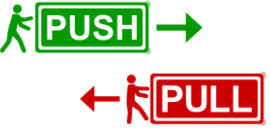







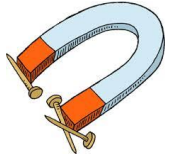

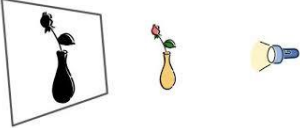

By the end of each key stage, children are expected to know, apply and understand the skills and techniques specified in the Science curriculum plans.



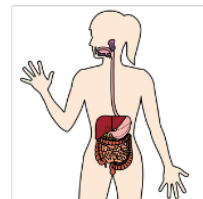












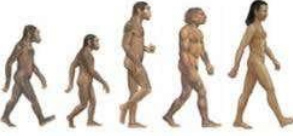


Pupils' are assessed using our SONAR tracking system which identifies clear and progressive end points. This ensures progress is maintained and end of key stage expectations are met by all children. Children are assessed termly and a final summative assessment made at the end of the academic year. Children will be assessed as either Emerging, Developing, Secure or Exceeding, in accordance with Age Related Expectations.

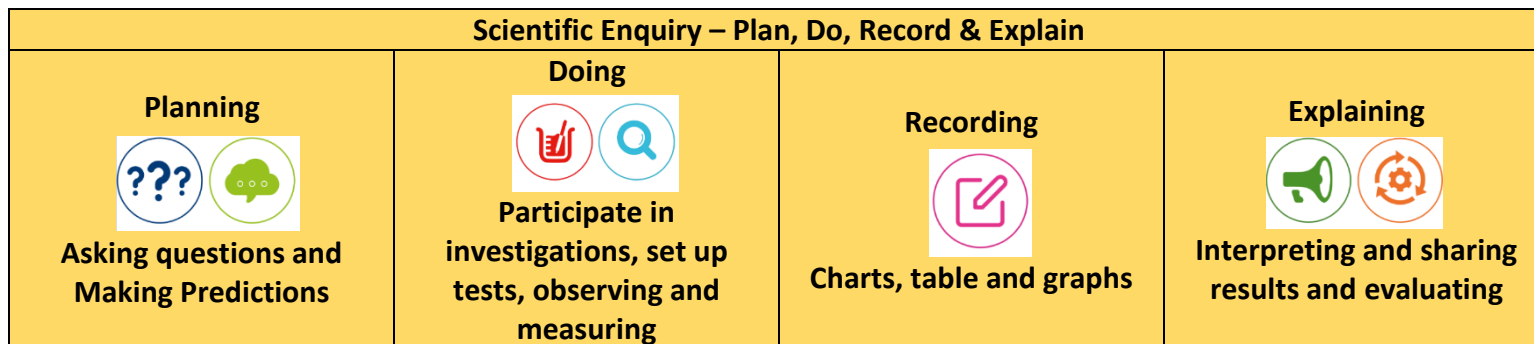
In addition, we measure the impact of our curriculum through the following methods:

- A reflection on standards achieved against the planned outcomes;
- A celebration of learning for each term which demonstrates progression across the school (Curriculum Floor book);
- Tracking of knowledge in pre and post learning activities;
- Pupil discussions about their learning (Pupil Voice);
- The annual tracking of standards across the curriculum. In KS1 and KS2

School Overview of Science Coverage










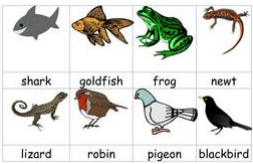




	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	<p>Seasonal Change Weather Watch</p>  <p>Seasonal Changes Signs of Autumn</p> 	<p>Materials Everyday Materials</p> 	<p>Animals Including Humans My Body and the 5 Senses</p>  <p>Seasonal Change Signs of Winter</p> 	<p>Animals Including Humans Identifying Animals</p> 	<p>Seasonal Change Signs of Spring</p>  <p>Plants Identifying Plants</p> 	<p>How Plants Grow</p>  <p>Seasonal Change Signs of Summer</p> 
Year 2	<p>Forces Moving Things</p> 	<p>Living Things and Their Habitats Living in Habitats</p> 	<p>Materials Exploring Everyday Materials</p> 	<p>Electricity How does it work?</p> 	<p>Animals Including Humans Growth and Survival</p> 	<p>Plants Ready, Steady, Grow</p> 
Year 3	<p>Plants How Plants Grow and Reproduce</p> 	<p>Animals including Humans Health and Movement</p> 	<p>Forces Forces and Magnets</p> 	<p>Rocks, Fossils and Soil</p> 	<p>Light Light and Shadow</p> 	<p>Scientists and Inventors</p> 

Year 4	Sound Making and Changing Sound 	Living things and their Habitats Living in Environments 	Animals including Humans Eating and Digestion 	Electricity Circuits and Conductors 	Materials States of Matter 	Scientists and Inventors 
Year 5	Earth and Space 	Materials Properties and Changes of Materials 	Living Things and their Habitats Life Cycles 	Animals, including Humans Changes and Reproduction 	Forces Forces in Action 	Scientists and Inventors 
Year 6	Animals including Humans Heathy Bodies 	Electricity Changing Circuits 	Living Things and Their Habitats Classifying Organisms 	Evolution and Inheritance 	Light and Sound Seeing Light 	Scientists and Inventors 







Please refer to the Science Progression Ladders for full details of knowledge and skills progression

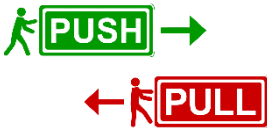




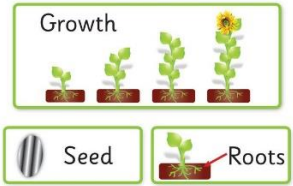
Year 1

Year 1					
<p>Planning</p> 		<ul style="list-style-type: none"> Ask a simple question about how or why something happens Begin to understand that scientific ideas are more than guesses, and base them on previous knowledge and understanding 			
<p>Doing</p> 		<ul style="list-style-type: none"> Observe closely using simple equipment to help them – e.g. magnifying glass Perform simple tests using simple equipment – e.g. a timer Begin to recognise similarity, difference and change in relation to objects, materials or living things Understand basic safety rules when testing out their ideas 			
<p>Recording</p> 		<ul style="list-style-type: none"> Collect data collaboratively as a class – e.g. a weather station, rainfall, plant height Count and sort data sets – types trees in a field Sort data within given criteria – tall trees, wet days, blue eyes, material type Record what they have seen or done in different ways, including drawing and labelling diagrams Record some information onto a pre-prepared Venn diagram or table Label and sort objects according to simple criteria 			
<p>Explaining</p> 		<ul style="list-style-type: none"> Talk simply about what they see and answer simple questions about what they see Describe features of familiar observations with simple vocabulary—parts of the body, materials, senses etc Suggest simple reasons why things might happen, or why something has happened 			
Autumn		Spring		Summer	
<p>Seasonal Change Weather Watch</p>  <p>Seasonal Changes Signs of Autumn</p> 	<p>Materials Everyday Materials</p> 	<p>Animals Including Humans My Body and the 5 Senses</p>  <p>Seasonal Change Signs of Winter</p> 	<p>Animals Including Humans Identifying Animals</p> 	<p>Seasonal Change Signs of Spring</p>  <p>Plants Identifying Plants</p> 	<p>How Plants Grow</p>  <p>Seasonal Change Signs of Summer</p> 
<ol style="list-style-type: none"> What do we already know about weather? What are the seasons? How much water falls when it rains? 	<ol style="list-style-type: none"> What is a material? What is it made from? How can I describe materials? <ul style="list-style-type: none"> Which materials are waterproof? 	<ol style="list-style-type: none"> What is the weather like in Winter? What happens to some animals in winter? What are the days like in winter? 	<ol style="list-style-type: none"> What animals can I identify? What do they eat? What is a mammal? 	<ol style="list-style-type: none"> What happens as Winter turns to Spring? What is the weather like in Spring? What can I see on a Spring walk? 	<ol style="list-style-type: none"> What are the parts of a plant? How do plants change as they grow?

<p>4. How are animals affected by the seasons?</p> <ul style="list-style-type: none"> • How can we tell if the wind is blowing? 		<p>4. How do we measure temperature?</p> <ol style="list-style-type: none"> 1. What are the names of the parts of my body? 2. How do I use my body to complete tasks? 3. What is sight? 4. What is touch? 5. What is smell? 6. What is taste? <ul style="list-style-type: none"> • What is hearing? 	<ol style="list-style-type: none"> 3. What are birds and reptiles? 4. What are fish and amphibians? <ul style="list-style-type: none"> • How do we take care of animals? 	<ol style="list-style-type: none"> 1. What is a plant? 2. What plants can we see in the garden? 3. What are wild plants? <ul style="list-style-type: none"> • What is a tree? 	<ol style="list-style-type: none"> 1. What changes as Spring turns into Summer? 2. What is the weather like on Summer? <ul style="list-style-type: none"> • How do I stay safe in the sun?
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Year 2





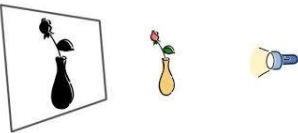

<p>Planning</p> 	<ul style="list-style-type: none"> • Ask a range of questions about how things work or why things happen • Find things out, with help and suggestions from adults • Begin to make predictions about what might happen <p>Understand the key elements that make something fair (fair test)</p>
<p>Doing</p> 	<ul style="list-style-type: none"> • Make and describe relevant observations of things as they happen • Observe closely using simple equipment to help them measure or record changes – e.g. magnifying glass, timer, ruler • Recognise similarity, difference and change in relation to objects, materials or living things <p>Use simple apparatus effectively and safely</p>
<p>Recording</p> 	<ul style="list-style-type: none"> • Gather and record data to help in answering questions and understand why this is important • Use tallies to count in surveys • Record or present their data using simple tally charts and tables • Record or present their data using simple block graphs, pictograms and bar charts (scaffolded) • Identify, classify and sort using bulleted lists and Venn diagrams • Make sketches/drawings of their observations and label as appropriate • Use books to find information
<p>Explaining</p> 	<ul style="list-style-type: none"> • Answer simple questions using evidence from what they observed during their investigations • Ask 'why' and 'what' questions about what they observed • Suggest simple reasons and explanations for what they have seen • Begin to use cause and effect in their explanations <p>Use some scientific vocabulary when explaining</p>

Autumn		Spring		Summer	
<p>Forces</p> <p>Moving Things</p> 	<p>Living Things and Their Habitats</p> <p>Living in Habitats</p> 	<p>Materials</p> <p>Exploring Everyday Materials</p> 	<p>Electricity</p> <p>How does it work?</p> 	<p>Animals Including Humans</p> <p>Growth and Survival</p> 	<p>Plants</p> <p>Ready, Steady, Grow</p> 
<p>5. How does it move?</p> <p>6. How can I make an object move?</p>	<p>1. What is the difference between living, dead</p>	<p>1. Can materials be sorted into groups?</p>	<p>1. What things use electricity?</p>	<p>1. Who is my baby?</p> <p>2. How are animal babies born?</p>	<p>1. What is the difference between seeds and bulbs?</p>

<p>7. How does it work – the play park?</p> <p>8. Movement Investigation</p> <p>9. Investigation – float or sink?</p>	<p>and never being alive?</p> <p>2. What do humans need to stay alive?</p> <p>3. Do all minibeasts like living in the same microhabitats?</p> <p>4. How Do I Survive?</p> <p>5. What do living things depend on?</p> <p>6. What is a food chain?</p>	<p>2. What does it mean for materials to be natural and man-made?</p> <p>3. How can a material change shape?</p> <p>4. Why do we use metal and plastic?</p> <p>5. London Bridge is falling down! What is the best paper to use?</p>	<p>2. How do I stay safe around electricity?</p> <p>3. What is a battery?</p> <p>4. What is the difference between mains and battery power?</p> <p>How do we make simple electrical circuits?</p>	<p>3. How do humans change as they grow?</p> <p>4. What do animals and humans need to survive?</p> <p>5. What is a balanced diet?</p> <p>Hygiene how clean are your hands?</p>	<p>2. Where can we find seeds?</p> <p>3. How are seeds dispersed?</p> <p>4. What is germination?</p> <p>5. How does a sunflower grow?</p>
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Year 3



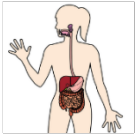



<p>Planning</p> 	<ul style="list-style-type: none"> • Think of questions to ask during testing • Decide on approaches to answer questions and suggest own ideas • Choose what observations to make • Select suitable equipment • Recognise that scientific ideas are more than guesses, and base them on previous knowledge and understanding. Predict what may happen before testing • Identify features that will make a fair test and carry out a fair test with help • Know that questions can be answered in different ways
<p>Doing</p> 	<ul style="list-style-type: none"> • Make suggestions about how to collect data to answer a question • Examine closely and question what is seen • Begin to repeat observations over time • Begin to take accurate measurement with standard units (length, time)
<p>Recording</p> 	<ul style="list-style-type: none"> • Begin to recognise the importance of data collection when investigating in science • With support make a series of observations or measurements and record using prepared tables, pictograms, bar charts and graphs • Classify observations of simple features –flowers, animals, trees using Venn diagrams with up to 3 criteria • With support record and label sketches and diagrams, sometimes with notes using simple scientific language and vocabulary • Begin to plot points for simple graphs (such as bar charts) • Use ICT to record results
<p>Explaining</p> 	<ul style="list-style-type: none"> • Use pre-prepared sources of information to analyse simple data patterns and offer oral and written explanations • Explain what they found out from an investigation in simple terms and link it to prior knowledge. • Use data gathered through first hand observation to support their explanations • Compare what happened to what might have happened and give simple explanations • Begin to suggest ways to improve an investigation or identify things that went wrong

Autumn		Spring		Summer	
<p align="center">Plants</p> <p>How Plants Grow and Reproduce</p> 	<p align="center">Animals including Humans</p> <p>Health and Movement</p> 	<p align="center">Forces</p> <p>Forces and Magnets</p> 	<p align="center">Rocks, Fossils and Soil</p> 	<p align="center">Light</p> <p>Light and Shadow</p> 	<p align="center">Scientists and Inventors</p> 
<p>1. What are the parts and functions of flowering plants?</p>	<p>1. Why do we eat? 2. What is a healthy, balanced diet?</p>	<p>1. What is a force? 2. How do objects move on different surfaces? 3. How do Magnets Work?</p>	<p>1. Are all rocks the same? 2. How can we classify rocks?</p>	<p>1. Why do we need light? 2. Why do we have night and day? 3. What is a shadow?</p>	<p>1. Who was Marie Curie and what is she known for?</p>

<p>2. How is water transported around plants?</p> <p>3. What is essential for the growth of green plants?</p> <p>4. How does pollination occur?</p> <p>How are seeds dispersed?</p>	<p>3. How do animal diets differ?</p> <p>4. To investigate what pets eat?</p> <p>5. How are the skeletons of humans and animals different?</p> <p>6. Why is the skeleton important?</p> <p>How do our muscles help us to move?</p>	<p>4. Which materials are attracted to magnets?</p> <p>5. What properties do magnetic materials have in common?</p> <p>6. How do we use Magnets</p>	<p>3. How can we investigate the properties of rocks?</p> <p>4. What is soil?</p> <p>5. What are fossils and how are they formed?</p> <p>6. What is a palaeontologist?</p>	<p>4. How do shadows behave?</p> <p>5. How do shadows change during the day?</p> <p>6. How is light reflected?</p>	<p>2. Who was Mary Anning and what is she known for?</p> <p>What is an electromagnet and why are they important?</p>
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Year 4

<p>Planning</p> 	<ul style="list-style-type: none"> Decide on the best approaches for an investigation Set up simple practical investigations using equipment Begin to suggest different ways to collect data Make predictions based on prior scientific knowledge ‘I think that ... will happen because...’ Describe or show how to vary a factor and keep others the same
<p>Doing</p> 	<ul style="list-style-type: none"> Make a series of systematic and careful observations over time Compare observations made over a period of time Repeat tests and explain differences that may occur Use data loggers to gather information
<p>Recording</p> 	<ul style="list-style-type: none"> Gather and classify increasingly complex data in a variety of ways Record findings using simple scientific diagrams and labels, classification keys and line graphs.
<p>Explaining</p> 	<ul style="list-style-type: none"> Describe, compare and identify data patterns using prepared data (bar charts and tables) Report on findings from investigations – oral and written explanations, presentations of results and simple conclusions Provide explanations using developing scientific language and vocabulary Begin to link explanations to scientific ideas and concepts Compare what happened to what was expected Suggest improvements to an investigation, giving reasons linked to things that went wrong

Autumn		Spring		Summer	
<p>Sound Making and Changing Sound</p> 	<p>Living things and their Habitats Living in Environments</p> 	<p>Animals including Humans Eating and Digestion</p> 	<p>Electricity Circuits and Conductors</p> 	<p>Materials States of Matter</p> 	<p>Scientists and Inventors</p> 
<ol style="list-style-type: none"> How are sounds made? How do we hear sounds? Can sound travel through materials? Can sound travel across distances? 	<ol style="list-style-type: none"> What is a habitat? How can we group living things? How can we classify animals into groups? How do we use a classification key to classify animals? 	<ol style="list-style-type: none"> What is a carnivore, herbivore and omnivore? What is a food chain? What are human teeth like? How do we keep our teeth healthy? 	<ol style="list-style-type: none"> What can we use to create a circuit? What is the difference between battery and mains power? What are conductors and insulators 	<ol style="list-style-type: none"> What are solids, liquids and gases? What is a gas? How does heat and cold change materials? At what temperature do materials change? What is evaporation? 	<ol style="list-style-type: none"> Who was Thomas Edison and what was he known for? Who was Alexander Graham Bell and what was he known for? Can I invent and investigate toothpaste?





<p>5. Which materials are the best at insulating sound?</p> <p>6. What are pitch and volume?</p>	<p>5. How do we use a classification key for plants?</p> <p>What impact do Humnas have on habitats?</p>	<p>5. What is the digestive system?</p> <p>6. How does the digestive system work?</p>	<p>4. Why do we need conductors and insulators?</p> <p>5. How can we make a switch?</p> <p>6. How can we make a bulb shine brighter?</p>	<p>6. What is condensation?</p> <p>7. What is the water cycle?</p>	
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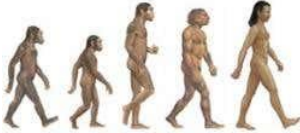


Year 5

Year 5					
<p>Planning</p>  <ul style="list-style-type: none"> • Begin to plan different types of scientific enquiries to answer questions • With support recognise and control simple variables where necessary • Begin to make practical suggestions about working methods and improvements 					
<p>Doing</p>  <ul style="list-style-type: none"> • Take a range of measurements using a range of equipment, including thermometers, with increasing accuracy and precision • Use data loggers to gather information 					
<p>Recording</p>  <ul style="list-style-type: none"> • Gather and classify increasingly complex data in a variety of ways • Record findings using simple scientific diagrams and labels, classification keys and line graphs. 					
<p>Explaining</p>  <ul style="list-style-type: none"> • Use results to draw simple conclusions, make predictions for new investigations, suggest improvements • Offer explanations for differences and similarities in results using scientific knowledge • Begin to relate conclusions to patterns, previous knowledge and observational evidence • Make judgements and conclusions about what has been seen, and support these with known facts • Develop further observations and experiments from results • Justify their own theories through observation and conclusion • Report on findings from investigations, including oral and written explanations, displays or presentations of results and conclusions • Use straightforward scientific evidence to answer questions or support findings 					
Autumn		Spring		Summer	
<p>Earth and Space</p> 	<p>Materials Properties and Changes of Materials</p> 	<p>Living Things and their Habitats Life Cycles</p> 	<p>Animals, including Humans Changes and Reproduction</p> 	<p>Forces Forces in Action</p> 	<p>Scientists and Inventors</p> 
<ol style="list-style-type: none"> 1. What do we know about the sun, earth and moon? 2. Why do we have day and night? 3. What are the seasons? 	<ol style="list-style-type: none"> 1. What happens when we mix materials with water? 2. Can we reverse the process of dissolving materials in water? 3. Are all material changes reversible? 	<ol style="list-style-type: none"> 1. How do flowering plants reproduce? 2. What is asexual reproduction? 3. How do animals reproduce? 4. Are animal life cycles all the same? 	<ol style="list-style-type: none"> 1. What are the stages in the life cycle of a human? 2. What is the gestation period? 3. How do babies develop in their first year? 	<ol style="list-style-type: none"> 1. What is weight? 2. What is Friction 3. What is Air resistance? 4. What is water resistance? 5. How to levers and pulleys work? 	<ol style="list-style-type: none"> 1. How can we use science to solve crimes? 2. Who is Sir David Attenborough and what is he known for? 3. What do we know about Margaret

<p>4. What do we know about the moon?</p> <p>5. What do we know about the solar system?</p> <p>6. What do we know about the planets in the solar system?</p>	<p>4. Can heating and cooling change materials?</p> <p>5. What happens when something burns?</p> <p>6. How can we group different materials?</p> <p>7. Investigating Materials</p>	<p>5. Are animal lifecycles adapted to where they live?</p>	<p>4. What happens as we get older?</p> <p>Include here lessons from the RSE curriculum</p>	<p>6. What are gears and how do they work?</p>	<p>Hamilton and what is she known for?</p>
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Year 6

<p>Planning</p> 	<ul style="list-style-type: none"> • Begin to plan different types of scientific enquiries following a structured investigation model provided for them- stages of investigation to answer questions • With support recognise and control simple variables where necessary • Begin to make practical suggestions about working methods and improvements
<p>Doing</p> 	<ul style="list-style-type: none"> • Take measurements using a range of equipment, including thermometers, with increasing accuracy and precision • Understand the need to repeat readings when appropriate to determine accuracy
<p>Recording</p> 	<ul style="list-style-type: none"> • Gather and classify complex data in a variety of ways • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, scatter graphs and line graphs.
<p>Explaining</p> 	<ul style="list-style-type: none"> • Report and present findings from investigations including conclusions and explanations • Report on findings from investigations, including oral and written explanations, displays or presentations of results and conclusions Evaluate the results of observations • Combine observations to give new hypotheses • Look for and understand poor or invalid data • Identify differences, similarities or changes related to simple scientific ideas and processes • Use a range of scientific enquiry to answer questions • Use test results to make predictions and to set up further comparative and fair tests • Identify scientific evidence that has been used to support or refute ideas or arguments

Autumn		Spring		Summer	
<p align="center">Animals including Humans Heathy Bodies</p> 	<p align="center">Electricity Changing Circuits</p> 	<p align="center">Living Things and Their Habitats Classifying Organisms</p> 	<p align="center">Evolution and Inheritance</p> 	<p align="center">Light and Sound Seeing Light</p> 	<p align="center">Scientists and Inventors</p> 
<ol style="list-style-type: none"> 1. What is the circulatory system – heart, lungs and blood vessels 2. What is the function of the human heart? 3. How does blood move around the body? 	<ol style="list-style-type: none"> 1. How can we change circuits to make 	<ol style="list-style-type: none"> 1. Why do we classify living things? 2. How can we distinguish between organisms that have similar characteristics? 	<ol style="list-style-type: none"> 1. What is inheritance? 2. What is adaptation? 3. What is evolution? What are the theories of Evolution 	<ol style="list-style-type: none"> 1. What is light and how does it travel? How are shadows formed? 2. Investigation – How can we change Shadows? 3. How does the eye allow us to see things? 	<ol style="list-style-type: none"> 1. Pioneering Science: The Human Heart – Who was Dr Daniel Hale Williams? 2. Who was Rosalind Franklin and what did she discover??

<p>4. How are muscles and the skeleton linked?</p> <p>5. Science Investigation – Is there a link between heart beat and exercise?</p> <p>How do drugs affect the human body?</p>	<p>different things happen?</p> <p>2. How can we record our circuits using conventional symbols?</p> <p>3. Science Investigation – Circuits</p>	<p>3. How do we classify organisms?</p> <p>4. How do we classify living things? The Linnaean System</p> <p>5. What is a micro-organism?</p> <p>Investigation – What is Yeast?</p>	<p>4. Which Scientists helped us to understand evolution?</p> <p>5. Evolution in Practice – how have living things change over time?</p> <p>6. How have humans evolved over time?</p> <p>How have humans affected the Evolution of other living things?</p>	<p>4. How do we see objects?</p> <p>5. What is reflection?</p> <p>6. Spectacular Spectrum – Are there colours in white light?</p>	<p>3. Science in Action Meet 2 doctors – What is a vaccine?</p>
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Key Stage One

Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Year One

Plants

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- identify and describe the basic structure of a variety of common flowering plants, including trees.

Animals (including humans)

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- 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.

Everyday Materials

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties.

Seasonal Changes

- observe changes across the four seasons
- observe and describe weather associated with the seasons and how day length varies.

Year Two

Living Things & Their Habitats

- explore and compare the differences between things that are living, dead, and things that have never been alive
- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- identify and name a variety of plants and animals in their habitats, including micro-habitats
- describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

Plants

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Animals (including humans)

- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Uses of Everyday Materials

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Lower Key Stage Two

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
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Year Three

Plants

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Animals (including humans)

- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Rocks

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

Light

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by a solid object
- find patterns in the way that the size of shadows change.

Forces & Magnets

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Year Four

Living Things & Their Habitats

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.

Animals (including humans)

- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey.

States of Matter

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Sound

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases

Electricity

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.

Upper Key Stage Two

Working Scientifically

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

Year Five

Living Things & Their Habitats

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals.

Animals (including humans)

- describe the changes as humans develop to old age.

Properties & Changes of Materials

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Earth & Space

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Forces

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Year Six

Living Things & Their Habitats

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.

Animals (including humans)

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Evolution & Inheritance

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Light

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Electricity

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.

Key Stage 1 Year 1 Science Curriculum Coverage		Signs of Autumn	Identifying Plants Signs of Winter	My Body Identifying animals	Signs of Spring	Everyday Materials	How plants grow? Signs of Summer
Science	<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions 						
	<ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies 						
	<ul style="list-style-type: none"> 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 						

Key Stage 1 Year 2 Science Curriculum Coverage		Moving Things	Living in Habitats	Exploring Everyday materials	Electricity	Growth and Survival	Plant Growth
Science	<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						

Lower Key Stage 2 Year 3 Science Curriculum Coverage		How plants grow and Reproduce	Health and Movement	Forces and magnets	Rocks, Fossils and Soil	Light and Shadow	Scientists And Inventors
Science	<ul style="list-style-type: none"> 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 identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings. 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 changes 						
Lower Key Stage 2 Year 4 Science Curriculum Coverage		Changing Sound	Living in Environments	Circuits and Conductors	Eating and Digestion	Materials States of Matter	Scientists and Inventors
Sc	<ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them 						

	<ul style="list-style-type: none"> • 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 • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. 						
	<ul style="list-style-type: none"> • 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 						
	<ul style="list-style-type: none"> • 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 						
	<ul style="list-style-type: none"> • 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 						
	<ul style="list-style-type: none"> • 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 						
	<ul style="list-style-type: none"> • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors 						

Upper Key Stage 2 Year 5 Science Curriculum Coverage		Earth and Space	Properties and Changes of Materials	Life Cycles	Changes and Reproduction	Forces in action	Scientists and Inventors
Science	<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 						

	<ul style="list-style-type: none"> recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> describe the changes as humans develop to old age 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						
	<ul style="list-style-type: none"> 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 						

Upper Key Stage 2 Year 6 Science Curriculum Coverage		Healthy Bodies	Electricity Changing Circuits	Classifying Organisms	Evolution and Inheritance	Seeing Light	Scientists And Inventors
Science	<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments 						
	<ul style="list-style-type: none"> 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 						

<ul style="list-style-type: none"> • 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 						
<ul style="list-style-type: none"> • 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 						
<ul style="list-style-type: none"> • 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 						
<ul style="list-style-type: none"> • 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 						