



Science Curriculum Document



Intent Statement

At Hartsfield, we believe science is integral to understanding the world around us. We aim to deliver a fun, practical and motivating science curriculum that nurtures the innate curiosity of all pupils. We strive to foster an appreciation of nature and a sense of responsibility to protect and nurture our fragile environment.

By closely following the national curriculum and the programmes of study, the children acquire and develop the key knowledge that has been identified within each unit and across each year group. We aim to help develop science understanding by making links between the learning in the classroom and pupil's real-life observations and experiences.

We ensure that working scientifically skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments and investigation, being familiar with scientific terminology and, most importantly, to continue to ask questions and be curious about their surroundings.

All children will be provided with a broad and balanced science curriculum which reflects the equality and diversity policies and practice within our school. We are keen to develop the 'Science Capital' of all pupils, ensuring that each child, receives a wide range of positive and enriching science experiences, throughout their time at Hartsfield. We aim to demonstrate the relevance of science in the wider world, informing pupils of the many diverse, exciting careers that studying science opens up to them. Our teachers strive to personalise the learning and engage pupils by establishing their prior knowledge, interests and experiences and collating information on science expertise within families.

Implementation Statement


At Hartsfield, the science curriculum covers a range of knowledge and working scientifically skills as set out in the National Curriculum for Science and the Early Years Framework. The knowledge is organised into different Biology, Chemistry and Physics topics, which are taught in half-term blocks. Most topics are taught in 2-year cycles, so there is an opportunity to re-visit and address any misconceptions before progressing forward. Working scientifically skills are grouped into KS1, Lower KS2 and Upper KS2 and built on across the 3 phases (see separate knowledge and skills progression documents for more detail). To support us in delivering a high quality curriculum, we use material provided by 'Herts for Learning'. This provides a clear breakdown of the knowledge required for each topic including additional statements to assess those pupils working at greater depth. It also includes working scientifically assessment tasks for each topic in each year group.

At the beginning of the topic, children are encouraged to share what they already know and what they would like to find out and this helps to make the programme of study responsive to the children's understanding and interests. Staff continuously seek to develop inquisitiveness through their lessons, using resources such as Explorify, Concept Cartoons and Big Questions, to encourage creative thinking and discussion.


To help develop the science capital of all pupils, scientists from our community, including parents, are encouraged to visit the school to talk about their jobs and many school trips are science-based. Extra-curricular science clubs such as Labtots and Nature Citizens are well attended – the latter seeking to address environmental issues in a pro-active way. Children are kept informed of key science events in the wider world during a weekly news assembly.

Whole School- Science Skills Progression

Learning Objectives	EYFS	KS1	LKS2	UKS2
Asking questions and recognising that they can be answered in different ways.	<p>Ask questions to find out more and to check they understand what has been said to them. (Communication and language)</p> <ul style="list-style-type: none"> • While playing and exploring, the children ask 'I wonder...' questions. • With support, the children develop their ideas for answering their questions. 	<p>Asking simple questions and recognising that they can be answered in different ways.</p> <ul style="list-style-type: none"> • While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. • The children answer questions developed with the teacher often through a scenario. • The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. 	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <ul style="list-style-type: none"> • The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. • The children answer questions posed by the teacher. • Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <ul style="list-style-type: none"> • Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.



<p>Making observations and taking measurements.</p>	<p>Explore the natural world around them. (Understanding the world) Describe what they see, hear and feel whilst outside. (Understanding the world) Develop their small motor skills so that they can use a range of tools competently, safely and confidently. (Physical development) Count objects, actions and sounds. (Mathematics) Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. (Communication and language) Show resilience and perseverance in the face of challenge. (Personal, social and emotional development) • Explore the natural and made world using their senses.</p>	<p>Observing closely, using simple equipment. • Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. • They begin to take measurements, initially by comparisons, then using non-standard units.</p>	<p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • The children make systematic and careful observations. • They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.</p>	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value)</p>
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	<ul style="list-style-type: none"> • The children use magnifying glasses or tablets with magnifiers to make observations. • The children use smaller pieces of equipment such as syringes and pipettes. • With support, make comparisons, using hands and feet and other non-standard measures e.g. building blocks and beakers. • While playing and exploring, the children, try out using resources to answer a question. • The children test things out to make comparisons e.g. Does the red car go further than the blue car? • They identify and name objects by matching them with pictures. • The children sort and group objects, sometimes using their own criteria. 			
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<p>Engaging in practical enquiry to answer questions.</p>		<p>Performing simple tests</p> <ul style="list-style-type: none"> • The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time. Identifying and classifying • Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. • They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. 	<p>Setting up simple practical enquiries, comparative and fair tests</p> <ul style="list-style-type: none"> • The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. • They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <ul style="list-style-type: none"> • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.
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<p>Recording and presenting evidence.</p>	<p>Connect one idea or action to another using a range of connectives. (Communication and language)</p> <p>Describe events in some detail. (Communication and language)</p> <ul style="list-style-type: none"> • The children, sometimes, draw and write simple labels to record their observations. • With support, they record their observations and comparisons e.g. using simple prepared tables, taking photographs, using sorting rings and boxes. 	<p>Gathering and recording data to help in answering questions.</p> <ul style="list-style-type: none"> • The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. • They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. • They classify using simple prepared tables and sorting rings 	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <ul style="list-style-type: none"> • The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • Children are supported to present the same data in different ways in order to help with answering the question. 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <ul style="list-style-type: none"> • The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • Children present the same data in different ways in order to help with answering the question.
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<p>Answering questions and concluding.</p>	<p>Listen to and talk about selected non-fiction to develop a deep familiarity with new knowledge and vocabulary. (Communication and language)</p> <p>Connect one idea or action to another using a range of connectives. (Communication and language)</p> <p>Describe events in some detail. (Communication and language)</p> <p>Compare length, weight and capacity. (Mathematics)</p> <ul style="list-style-type: none"> • The children talk about what they have observed. • The children demonstrate and talk about what they have found out. • They, sometimes, talk about what they have found out from secondary sources, including non-fiction texts. • The children notice and talk about how they made a difference to an outcome e.g. "My car went 	<p>Using their observations and ideas to suggest answers to questions.</p> <ul style="list-style-type: none"> • Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. • The children recognise 'biggest and smallest', 'best and worst' etc. from their data. • The children recognise 'biggest and smallest', 'best and worst' etc. from their data. 	<p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <ul style="list-style-type: none"> • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <ul style="list-style-type: none"> • Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <ul style="list-style-type: none"> • They draw conclusions based on their evidence and current subject knowledge. 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <ul style="list-style-type: none"> • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. • They talk about how their scientific ideas change due to new evidence that they have gathered. • They talk about how new discoveries change scientific understanding. <p>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</p>
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	<p>further when I pushed it harder.”</p> <ul style="list-style-type: none"> • The children make direct comparisons or use their recorded observations to communicate what they have found out and answer the question, where appropriate. 			<p><i>displays and other presentations.</i></p> <ul style="list-style-type: none"> • In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.
<p>Evaluating and raising further questions and predictions.</p>			<p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</i></p> <ul style="list-style-type: none"> • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. • Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. • Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry. 	<p><i>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.</i></p> <ul style="list-style-type: none"> • They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. • They identify any limitations that reduce the trust they have in their data. <p><i>Using test results to make predictions to set up further comparative and fair tests.</i></p>

				<ul style="list-style-type: none"> • Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.
Communicating their findings.			<p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <ul style="list-style-type: none"> • They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary. 	<p><i>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.</i></p> <ul style="list-style-type: none"> • They communicate their findings to an audience using relevant scientific language and illustrations.

EYFS Science-Learning Objectives and Knowledge Overview

	Autumn term	Spring term	Summer term
Main Topic	<ul style="list-style-type: none"> • Do you want to be my friend? • Let's Celebrate! 	<ul style="list-style-type: none"> • Will you read me a story? • Are we there yet? 	<ul style="list-style-type: none"> • All Creatures Great and Small • Transitions
Key Texts	<ul style="list-style-type: none"> • Goldilocks and the Three Bears • The Colour Monster • Ruby's Worry • Owl Babies • Kippers Birthday • Rama and Sita Diwali story • Kippers Birthday • The Nativity Story 	<ul style="list-style-type: none"> • The Gingerbread Man • Cinderella • The Three Little Pigs • The Three Billy Goats Gruff • The Chinese New Year Zodiac Story • Man on the Moon • Supertato • The Gruffalo 	<ul style="list-style-type: none"> • Handa's Surprise • Tinga Tinga Tales • What the Ladybird Heard • Farmer Duck • The Very Hungry Caterpillar • What the Ladybird heard on Holiday • Jack and the Beanstalk
Visits/Walks	<ul style="list-style-type: none"> • Signs of Autumn walk • Visit from fire brigade • Signs of winter Walk 	<ul style="list-style-type: none"> • Library Visit • Signs of Spring walk • Local trip (walking distance) 	<ul style="list-style-type: none"> • Signs of Summer Walk • School Trip
Weekly Topics	<ul style="list-style-type: none"> • Settling in • Fulltime • Baseline • Autumn • Harvest • Spooky Things • Diwali Fireworks • Potions • Friends • Light and Dark • Christmas 	<ul style="list-style-type: none"> • Goldilocks and the Three Bears • The Three Little Pigs • The Three Billy Goats Gruff • Chinese New Year • The Gingerbread man • The Gruffalo • Space • Supertato • Superheros • Easter 	<ul style="list-style-type: none"> • Seasons • Elmer • Handa's Surprise • Going to the Library • Herrings Green • The Queen's Jubilee • Father's Day • Sport's Week •

	<ul style="list-style-type: none"> • Panto Week • Our Performance 		
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UW Understanding the World.	<p>Exploring festivals and ways that people celebrate – Diwali, Harvest and Christmas etc</p> <p>Introduce iPads, computers and programmable toys</p> <p>Sharing and exploring children's experiences and environment</p> <p>Exploring and observing the differences in seasons</p> <ul style="list-style-type: none"> • Talking about members of our immediate family and community. • Exploring different beliefs and find out how they are celebrated by others. • Finding out about seasons of the year with a focus on Autumn and Winter. • Exploring different areas of the school and classroom. 	<p>Easter</p> <p>Develop skills of knowledge and understanding – predict, test and discuss</p> <p>Continue to develop technology skills and use of equipment.</p> <p>Explore book settings and relate to the world around us</p> <p>Exploring and observing the differences in seasons</p> <ul style="list-style-type: none"> • Compare and contrast characters from stories including figures from the past. • Draw information from a simple map. • Understand the effect of changing seasons on the natural world around them. • Comment on images of familiar situations in the past. 	<p>Continue to develop skills including predicting and testing.</p> <p>Continue to develop technology skills and use of equipment.</p> <p>Continue to explore the world around us and use own experiences.</p> <p>Exploring and observing the differences in seasons</p> <ul style="list-style-type: none"> • Comment on images of familiar situations in the past. • Recognise some similarities and differences between life in this country and life in other countries. • Recognise some environments that are different to the one in which they live. • Describe what they see, hear and feel whilst outside.
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Year 1 Science- Learning Objectives and Knowledge Overview

Y1 Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically , 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	Introduce	Revisit	Revisit
• observing closely, using simple equipment	Introduce	Revisit	Revisit
• performing simple tests	Introduce	Revisit	Revisit
• identifying and classifying	Introduce	Revisit	Revisit
• using their observations and ideas to suggest answers to questions	Introduce	Revisit	Revisit
• gathering and recording data to help in answering questions.	Introduce	Revisit	Revisit
Plants •Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees			Introduce
•Identify and describe the basic structure of a variety of common flowering plants, including trees		Introduce	Revisit
Animals, Including Humans •Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	Introduce		Revisit
•Identify and name a variety of common animals that are carnivores, herbivores and omnivores			Introduce
•Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)	Introduce		Revisit

<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	Introduce		
Uses of Everyday Materials <ul style="list-style-type: none"> Distinguish between an object and the material from which it is made 		Introduce	
<ul style="list-style-type: none"> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock 		Introduce	
<ul style="list-style-type: none"> Describe the simple physical properties of a variety of everyday materials 		Introduce	
<ul style="list-style-type: none"> Compare and group together a variety of everyday materials on the basis of their simple physical properties 		Introduce	
Seasonal Changes <ul style="list-style-type: none"> Observe changes across the 4 seasons 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> Observe and describe weather associated with the seasons and how day length varies 	Introduce	Revisit	Revisit

Y1 Science - Curriculum	Autumn	Spring	Summer
	Animals (Including Humans) <ul style="list-style-type: none"> Learn about the parts of the human body, the skeleton and our senses. Measuring the body Looking at bones and our skeleton The 5 senses What is animal classification? Mammals 	Materials <ul style="list-style-type: none"> Identify and name a range of everyday materials and their properties. Sorting materials Finding the best material for an umbrella Finding the best material for a bridge Which materials float and sink? 	Seasonal Changes <ul style="list-style-type: none"> 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, including deciduous and evergreen trees Observe and describe weather associated with the

	<ul style="list-style-type: none"> •Birds •Fish •Amphibians •Reptiles •Insects •Nocturnal Animals 	<ul style="list-style-type: none"> •Which materials are stretchy? <p>Silly materials</p> <p>Plants</p> <ul style="list-style-type: none"> • Identify and describe the structure of a plant. • Sunflowers • Plants you can eat • Cress heads • Bean germination • Seed dispersal • Wild flowers • Carnation colours 	<p>seasons and how day length varies.</p> <p>Animals (Including Humans)</p> <ul style="list-style-type: none"> • 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)
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Year 1 Science- Progression and Assessment

	Year 1 Plants
Slightly below ARE	<ul style="list-style-type: none"> • make observations of plants, including flowers and vegetables they have planted • identify the leaf, root, stem and flower of a plant • identify the trunk, branch, roots and leaves of a tree
Broadly within ARE	<ul style="list-style-type: none"> • know that plants produce seeds • identify differences between plants • identify and describe the basic structure of a variety of common flowering plants, including trees • name some common plants • name some plants that live in the garden • name some plants that live in the wild • name some trees in the local environment • recognise that different plants live in the local environment • use simple identification guides to name plants in the local environment • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
Above ARE	<ul style="list-style-type: none"> • compare and contrast different plants • sequence pictures of how plants changes over time • describe how deciduous trees changes throughout the year • explain why some plants are only seen at certain times of the year

	Year 1 Animals including humans
Slightly below ARE	<ul style="list-style-type: none"> • identify and name a selection of animals • make observations of animals • know that animals eat different types of food • use their observations to point out differences between humans and other animals and between animals and non-living things • identify and locate the sense organs • use senses to describe textures, sounds and smells
Broadly within ARE	<ul style="list-style-type: none"> • identify and sort animals into different groups • name the different groups of animals • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals

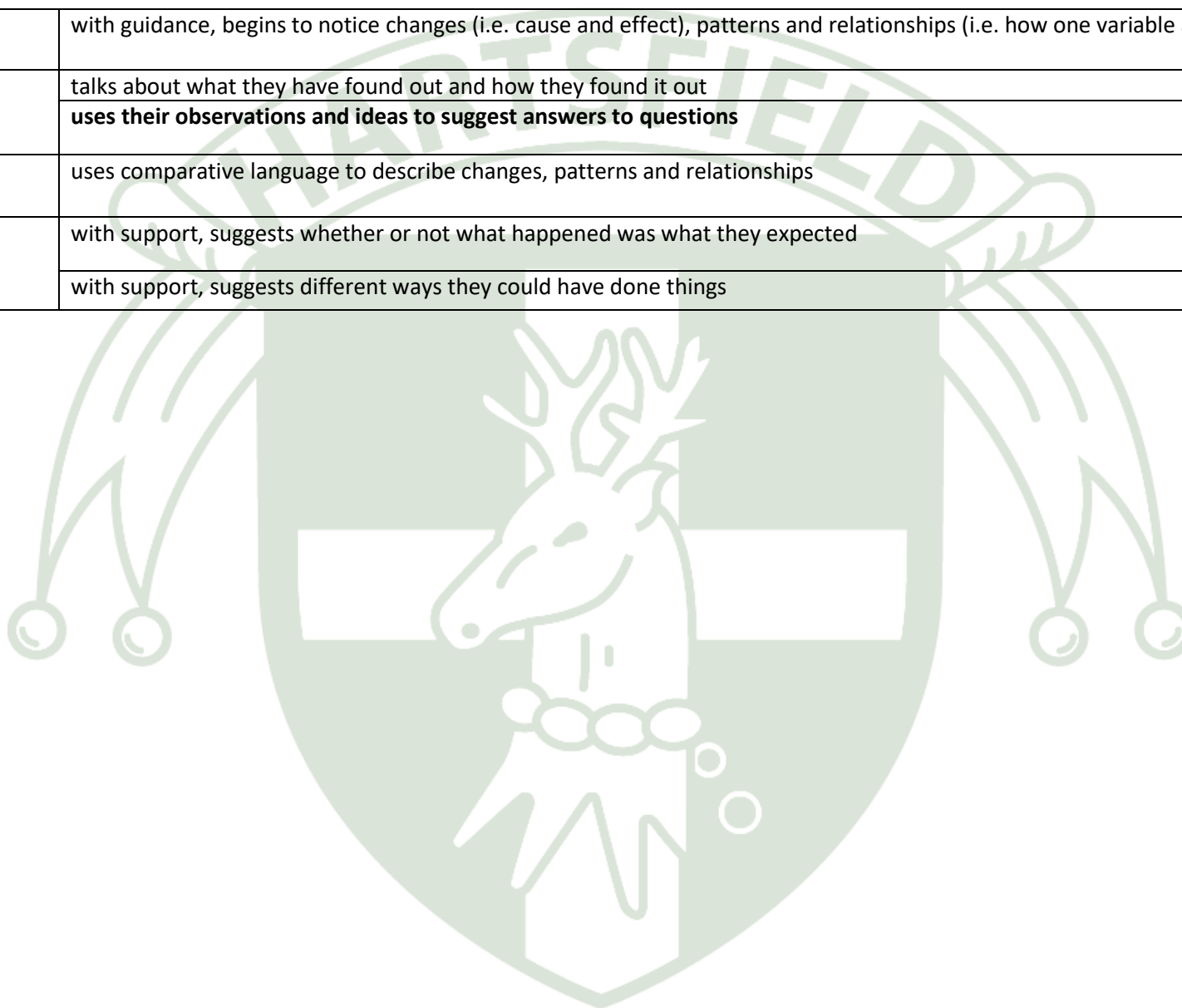
	<ul style="list-style-type: none"> recall and use the words: carnivore, herbivore and omnivore identify and name a variety of common animals that are carnivores, herbivores and omnivores identify the food of some common animals describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) compare differences in texture, sounds and smells name and locate the basic parts of the human body draw and label a simple body outline
Above ARE	<ul style="list-style-type: none"> group animals that belong to: carnivores, herbivores and omnivores describe differences between the different animal groups (e.g. birds have feathers but mammals have fur) identify animals which are more likely to be seen in different seasons explain why some animals are only seen at night

	Year 1 Seasonal changes
Slightly Below ARE	<ul style="list-style-type: none"> name the four seasons recall simple changes associated with each season observe and name types of weather (e.g. rain, sun, wind, clouds)
Broadly within ARE	<ul style="list-style-type: none"> observe changes across the four seasons identify what to observe use descriptive words, photos and pictures to record changes collect evidence of changes (e.g. leaves, seeds, flowers) observe and describe weather associated with the seasons and how day length varies identify what to measure about the weather use prepared tables and charts to record data
Above ARE	<ul style="list-style-type: none"> use secondary data to describe weather in another setting explain why animals are easier to spot at different times of year (e.g. migrating birds, hibernating animals)

	Year 1 Materials- Everyday Materials
Slightly below ARE	<ul style="list-style-type: none"> • name some common materials • name some common objects around the school and home • make observations of common objects and the different materials they are made of • communicate these observations using descriptive words (e.g. <i>bendy, rough, hard</i>)
Broadly within ARE	<ul style="list-style-type: none"> • distinguish between an object and the material from which it is made • identify some naturally occurring materials: wood, rock, water • identify some man-made materials: glass, metal, plastic • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • identify some properties of materials (e.g. see through, waterproof, absorbent) • 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 (both visible and non-visible)
Above ARE	<ul style="list-style-type: none"> • make predictions about which materials will float and sink • name materials which have lots of different uses (e.g. paper- wrapping paper, tissue paper, writing paper, birthday card) • describe objects that are made from lots of different materials • names objects that are sometimes made from different materials (e.g.: spoons- plastic, wooden, metal) • explain why people started using plastic bags rather than paper bags

Working Scientifically Criteria For KS1- Year 1	
Ideas, Questions and Planning	
Ideas and questions	asks simple questions and recognises that they can be answered in different ways ^{1.}
	recognises scientific and technical developments that help us ^{2.}
Planning	performs simple tests
	with guidance, suggests what they will do
	with guidance, identifies things to measure or observe that are relevant to the question
Equipment	uses resources provided or chosen from a limited range
	uses simple measurements and equipment to gather data
Variables	suggests why a test is unfair
Observing and Presenting Evidence	
Observing and measuring	observes closely (including changes over time), using simple equipment
	makes measurements using non-standard units ^{3.}
Secondary sources	uses simple secondary sources to find answers, e.g. books, videos, photographs or people
Recording information and data	gathers and records simple data to help in answering questions
	with support, prepares simple tables to record data
Presenting evidence	with help, records their findings in a range of ways, e.g. simple tables, diagrams, pictograms, sorting circles, bar charts and templates
	talks about their findings using everyday terms, text scaffolds or simple scientific language
Considering and Evaluating Evidence	
Looking for patterns	uses simple observable features to compare objects, materials and living things
	identifies and classifies (decides how to sort and group objects)

	with guidance, begins to notice changes (i.e. cause and effect), patterns and relationships (i.e. how one variable affects another)
Explaining results	talks about what they have found out and how they found it out
	uses their observations and ideas to suggest answers to questions
Communication	uses comparative language to describe changes, patterns and relationships
Evaluating	with support, suggests whether or not what happened was what they expected
	with support, suggests different ways they could have done things



Year 2 Science- Learning Objectives and Knowledge Overview

Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically , 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	Introduce	Revisit	Revisit
• observing closely, using simple equipment	Introduce	Revisit	Revisit
• performing simple tests	Introduce	Revisit	Revisit
• identifying and classifying	Introduce	Revisit	Revisit
• using their observations and ideas to suggest answers to questions	Introduce	Revisit	Revisit
• gathering and recording data to help in answering questions.	Introduce	Revisit	Revisit
Living Things & Their Habitats • explore and compare the differences between things that are living, dead, and things that have never been alive	Introduce		Revisit
• 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	Introduce		Revisit
• identify and name a variety of plants and animals in their habitats, including micro-habitats	Introduce		Revisit
• 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.	Introduce		Revisit

Plants <ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants 			Introduce
<ul style="list-style-type: none"> • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 			Introduce
Animals, Including Humans <ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults 	Introduce		Revisit
<ul style="list-style-type: none"> • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 	Introduce		Revisit
<ul style="list-style-type: none"> • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	Introduce		Revisit
Uses of Everyday Materials <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 		Introduce	
<ul style="list-style-type: none"> • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 		Introduce	

Science - Curriculum	Autumn	Spring	Summer
	Animals including humans Living things and their Habitats <ul style="list-style-type: none"> • Dead or Alive? • Microhabitats • Go Large! - larger habitats • Food chains • Designing and making a bug hotel • Adapting to a habitat • Lifecycle of chicks • Hatching and eggs • Babies: differences and similarity in adults and young. • Survival: What do animals including humans need for survival? • Healthy Hearts: the benefits of exercise • Deep inside my dinner: healthy eating and main food groups • A healthy picnic: healthy eating and main food groups. 	Everyday Materials <ul style="list-style-type: none"> • Absorbency—Mopping Up • Absorbency—Different materials. • Waterproofing materials. • Material properties—Printing • Recycling materials. • Squash, Bend, Twist & Stretch • Bouncy Balls • Stretchy fabrics • Rigidity • Tough and flexible • The strongest paper • Building Bridges 	Plants <ul style="list-style-type: none"> • Exploring the differences between things that are living, dead, and things that have never been alive. • Describing 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. • Observe and describe how seeds, beans and bulbs grow into mature plants • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • Food chains.

Year 2 Science- Progression and Assessment

	Year 2 Plants
Slightly below ARE	<ul style="list-style-type: none"> • know that flowering plants produce seeds which grow into new plants • know that some plants have bulbs from which they grow • make observations of plants over time
Broadly within ARE	<ul style="list-style-type: none"> • explore how plants from seeds and bulbs grow • describe what happens to bulbs during the plant cycle as they grow • describe what happens to a seed as it grows and develops • describe what they observe as new plants grow • observe and describe how seeds and bulbs grow into mature plants • suggest how to find out about what plants need in order to grow well • recognise that plants are living and need water, light and warmth to grow • describe differences between plants grown in the light and in the dark • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
Above ARE	<ul style="list-style-type: none"> • explain how to look after a variety of plants • compare the plant cycle for a plant from a seed with that from a bulb • know that a seed and bulb both contain everything a plant needs to grow • explain that seeds and bulbs do not need light to germinate and identify how this is different to the needs of a plant • explain how plants in the desert survive with little water and plants in the rainforest survive with little light

	Year 2 Animals including humans
Below ARE	<ul style="list-style-type: none"> • recognise that animals produce young • notice that animals, including humans, have offspring which grow into adults • recognise changes that take place as animals get older • identify the offspring of a selection of different animals • recognise that exercise is important • name some types of food • recognise that an adequate diet and exercise are necessary for them to grow and stay healthy
Broadly within ARE	<ul style="list-style-type: none"> • describe some differences they observe between babies and toddler • explain that adult animals no longer grow • make comparisons of the differences they observe between babies and toddlers • 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 • identify some types of food that make up their diet and name some examples of each • describe some of the types of food that they eat
Above ARE	<ul style="list-style-type: none"> • explain how to look after a pet describing what it needs to survive • use evidence to show that adult animals no longer grow • use evidence to show that children of the same age are not all the same size • use evidence to show that older children are generally taller than younger children

	Year 2 Living things and their habitats
Slightly Below ARE	<ul style="list-style-type: none"> • use their observations to point out differences between animals, plants and non-living things • recognise that plants provide food for humans and other animals within an environment • identify some local habitats • name a few of the organisms that live in a particular habitat
Broadly within ARE	<ul style="list-style-type: none"> • with help, use keys to identify some animals and plants • recognise that different plants live in the local environment • describe the simple features of habitats • recognise a microhabitat as a small habitat (e.g. leaf litter, woodlice under stones) • describe some microhabitats • identify and name a variety of plants and animals in their habitats, including micro- habitats • recognise similarities and differences between plants and animals • explore and compare the differences between things that are living, dead, and things that have never been alive • explain differences between living and non-living things in terms of characteristics such as movement and growth • construct a simple food chain (e.g. grass, cow, human) • 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 • suggest reasons why different plants and animals are found in the different environments • 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
Above ARE	<ul style="list-style-type: none"> • compare animals found in familiar habitats with unfamiliar habitats • compare plants found in familiar habitats with unfamiliar habitats • use different factors to compare a range of habitats (e.g. water, light, temperature)
	Year 2 Use of Everyday Materials
Slightly below ARE	<ul style="list-style-type: none"> • identify uses of some common materials • give a reason why a material is suitable for its job • identify materials that can be easily changed with force • identify materials that cannot be easily changed with force • describe pushes and pulls needed to change a material as big or small
Broadly within ARE	<ul style="list-style-type: none"> • recognise that some materials will have more than one property which increases its suitability for its purpose (e.g. glass is transparent, rigid and weatherproof)

	<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 • suggest several reasons why a material may or may not be suitable for a particular purpose • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching • describe changes in shapes as a result of the action of pushes, pulls and twists
Above ARE	<ul style="list-style-type: none"> • <i>explain why some materials change shape when a force acts (i.e. push, pull, twist, stretch) as a result of their properties</i> • explain why one material may be more suitable for a purpose than another by discussing properties • explain why plastics cause problems in the oceans • explain the importance of reusing and recycling plastic • describe how swimsuits have changed over time and how the fabric is now more suitable • describe how scientists have invented new materials (e.g. Macintosh, Dunlop)



Working Scientifically Criteria For KS1- Year 2	
Ideas, Questions and Planning	
Ideas and questions	asks simple questions and recognises that they can be answered in different ways ^{1.}
	recognises scientific and technical developments that help us ^{2.}
Planning	performs simple tests or follows teachers' instructions
	with guidance, suggests what they will do
	with guidance, identifies things to measure or observe that are relevant to the question
Equipment	uses resources provided or chosen from a limited range
	uses simple measurements and equipment to gather data
Variables	suggests why a test is unfair
Observing and Presenting Evidence	
Observing and measuring	observes closely (including changes over time), using simple equipment
	makes measurements using non-standard units ^{3.}
Secondary sources	uses simple secondary sources to find answers, e.g. books, videos, photographs or people
Recording information and data	gathers and records simple data to help in answering questions
	with support, prepares simple tables to record data
Presenting evidence	with help, records their findings in a range of ways, e.g. simple tables, diagrams, pictograms, sorting circles, bar charts and templates
	talks about their findings using everyday terms, text scaffolds or simple scientific language
Considering and Evaluating Evidence	
Looking for patterns	uses simple observable features to compare objects, materials and living things
	identifies and classifies (decides how to sort and group objects)

	with guidance, begins to notice changes (i.e. cause and effect), patterns and relationships (i.e. how one variable affects another)
Explaining results	talks about what they have found out and how they found it out
	uses their observations and ideas to suggest answers to questions
Communication	uses comparative language to describe changes, patterns and relationships
Evaluating	with support, suggests whether or not what happened was what they expected
	with support, suggests different ways they could have done things



Year 3 Science- Learning Objectives and Knowledge Overview

Y3 Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically (Lower Key Stage 2) <ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • setting up simple practical enquiries, comparative and fair tests 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • identifying differences, similarities or changes related to simple scientific ideas and processes 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • using straightforward scientific evidence to answer questions or to support their findings. 	Introduce	Revisit	Revisit

Plants <ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. 		Introduce	
<ul style="list-style-type: none"> • 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 		Introduce	
<ul style="list-style-type: none"> • investigate the way in which water is transported within plants 		Introduce	
<ul style="list-style-type: none"> • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 		Introduce	
Animals (including humans) <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 			Introduce
<ul style="list-style-type: none"> • identify that humans and some other animals have skeletons and muscles for support, protection and movement. 			Introduce
Rocks <ul style="list-style-type: none"> • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties 	Introduce		
<ul style="list-style-type: none"> • describe in simple terms how fossils are formed when things that have lived are trapped within rock 	Introduce		
<ul style="list-style-type: none"> • recognise that soils are made from rocks and organic matter. 	Introduce		
Light <ul style="list-style-type: none"> • recognise that they need light in order to see things and that dark is the absence of light 			Introduce

• notice that light is reflected from surfaces			Introduce
• recognise that light from the sun can be dangerous and that there are ways to protect their eyes			Introduce
• recognise that shadows are formed when the light from a light source is blocked by a solid object			Introduce
• find patterns in the way that the size of shadows change.			Introduce
Forces & Magnets	Introduce		
• compare how things move on different surfaces	Introduce		
• notice that some forces need contact between two objects, but magnetic forces can act at a distance	Introduce		
• observe how magnets attract or repel each other and attract some materials and not others	Introduce		
• 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	Introduce		
• describe magnets as having two poles	Introduce		
• predict whether two magnets will attract or repel each other, depending on which poles are facing.	Introduce		

Y3 Science - Curriculum	Autumn	Spring	Summer
	Forces & Magnets <ul style="list-style-type: none"> •compare movement on different surfaces. •magnetic forces attract and repel. •sort magnetic and non-magnetic materials. Rocks <ul style="list-style-type: none"> •compare and group based on properties. 	Rocks <ul style="list-style-type: none"> •compare and group based on properties. • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Plants <ul style="list-style-type: none"> •function of different parts of a plant. •transportation of water in plants. •life cycle of plants. 	Light <ul style="list-style-type: none"> •sources of light and formation of shadows. Animals (including humans): <ul style="list-style-type: none"> •animal nutrition •research food, compare and contrast diets of different animals. •skeleton of animals and humans •identify that some animals have skeletons and muscles for support, protection and movement.

Year 3 Science- Progression and Assessment

	Year 3 Plants
Slightly below ARE	<ul style="list-style-type: none"> • identify parts of flowering plants • recognise that plants need light, water and warmth and healthy leaves, roots and stems in order to grow well • know that plants make their own food • know that water travels from the roots up the stem • sequence pictures to show the life cycle of a plant
Broadly within ARE	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • describe why healthy roots and a healthy stem are needed for plants to grow • recognise that the leaves of a plant are associated with healthy growth and more specifically nutrition

	<ul style="list-style-type: none"> • know that fertilisers contain minerals • understand that plants absorb minerals from the soil (Teacher Note: plants create their own food using sunlight, water and carbon dioxide, they do not absorb food from the soil) • describe how changes to light and fertiliser affect plant growth • 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 • describe how the stem has a role in support and nutrition (transport of water) • describe why plants need flowers • describe the role of bees and insects in pollination • describe how pollen and seeds are dispersed • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
Above ARE	<ul style="list-style-type: none"> • <i>explain why healthy roots and a healthy stem are needed for plants to grow</i> • explain that differences in plant growth are due to the amount of light and/or water • compare methods of seed dispersal • compare the roots of different plants (e.g. desert plants or rainforest tree. Teacher Note: rainforest trees have very shallow roots as the quality of the soil is more and most of the nutrients are near the surface)

Year 3 Animals including humans	
Below ARE	<ul style="list-style-type: none"> • identify some foods needed for a healthy and varied diet • know they have bones and muscles in their body • state that they and other animals have skeletons • identify animals that do not have an internal skeleton (invertebrates) • group animals with and without an internal skeleton • recognise that their skeletons grow as they grow
Broadly within ARE	<ul style="list-style-type: none"> • name the components of a healthy and varied diet • describe how their diet is balanced • 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 • describe some observable characteristics of bones • describe the main functions of their skeletons • state that movement depends on both skeleton and muscles

	<ul style="list-style-type: none"> state that when one muscle contracts another relaxes identify that humans and some other animals have skeletons and muscles for support, protection and movement
Above ARE	<ul style="list-style-type: none"> describe an adequate and varied diet for humans, recognising that there are many ways of achieving this describe problems associated with broken bones or bones diseases describe some advantages of having an internal skeleton over no skeleton or an exoskeleton describe the role of different food groups compare and contrast diets of animals including pets

	Year 3 Rocks
Slightly below ARE	<ul style="list-style-type: none"> observe the characteristics of a variety of rocks name and describe the characteristics of several rocks identify fossils in rocks understand that there are rocks under the Earth's surface recognise that soil is a mixture of different materials and living things
Broadly within ARE	<ul style="list-style-type: none"> classify rocks from the evidence of investigations explain that rocks are used for different purposes dependent on their physical properties explain that different types of rock react differently to physical forces (e.g. water, rubbing) 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 soil contains dead plants and animals recognise that there is rock under all surfaces and that soils come from rocks recognise that soils are made from rocks and organic matter
Above ARE	<ul style="list-style-type: none"> relate the simple physical properties of some rocks to their formation explain how a model (e.g. biscuits, chocolate bars) can be used to represent sedimentary, metamorphic and igneous rocks describe how Mary Anning discovered fossils explain why we do not see the soft parts of animals in fossils explain why we might find lots of the same types of rock in one place explain why certain rocks are used for different purposes and why some rocks could be used for these jobs for example: <ul style="list-style-type: none"> Marble- kitchen worktops or statues Slate roof tiles or granite walls

	Year 3 Light
Slightly below ARE	<ul style="list-style-type: none"> • name a number of light sources, including the sun • recognise that they cannot see in the dark • state that reflections can be seen in shiny surfaces • makes generalisations about shiny surfaces (e.g. smooth) • recognise that light travels from a source • recognise that when light is blocked, a shadow is formed • make observations of changes in shadows
Broadly within ARE	<ul style="list-style-type: none"> • describe and compare some light sources • state that light sources are seen when light from them enters the eyes • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that they need light in order to see things and that dark is the absence of light • explain that places are dark because there is no light and a light source is needed to help us see in such places • notice that light is reflected from surfaces • demonstrate light travelling using a torch and record light bouncing off a mirror • identify suitable reflective clothing for travelling in the dark • explain that they cannot see shiny objects in the dark because there are no light sources • recognise that shadows are formed when the light from a light source is blocked by a solid object • recognise that shadows are similar in shape to the objects forming them • explain that shadows are formed when light from a source is blocked • state that even transparent objects block some light and form shadows • describe the difference in shadows cast by opaque, translucent and transparent materials • explore how to make shadows of different shapes and sizes • find patterns in the way that the size of shadows change
Above ARE	<ul style="list-style-type: none"> • use ideas about shadows to make predictions about the shadows formed by different objects or materials • describe how the length of a shadow changes throughout the day as the sun moves across the sky • describe how nocturnal animals are adapted to use what little light there is or their other senses in the dark (e.g. cats, aye-aye, lemurs) • describe how Percy Shaw invented cat's eyes and explain their importance to road safety

	Year 3 Forces and magnets
Slightly below ARE	<ul style="list-style-type: none"> • recognise that pushes and pulls are forces • recognise that a force acts in a particular direction • observe the movements, shape and direction of objects when forces act on them • identify friction as a force • observe and explore how friction affects the movement of objects • classify materials as magnetic or non-magnetic • recall that magnets have a north and a south pole
Broadly within ARE	<ul style="list-style-type: none"> • describe how to make a familiar object start moving by pushing or pulling • describe how to use pushes and pulls to make familiar objects speed up, slow down, change direction or shape • produce annotated drawings showing the direction of force needed to make an object move • describe some ways in which friction between solid surfaces can be increased or decreased • compare how things move on different surfaces • 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 the difference between a magnet and a magnetic material • describe what happens when some materials are put near a magnet • notice that some forces need contact between two objects, but magnetic forces can act at a distance • recall that magnets have a north and a south pole • describe magnets as having two poles • describe the direction of forces between magnets • predict whether two magnets will attract or repel each other, depending on which poles are facing
Above ARE	<ul style="list-style-type: none"> • describe some everyday uses of magnets • explain that a compass works by lining up with the Earth's magnetic field • describe how lodestone was found to be a naturally occurring magnet and was used as the first compass for navigation

Working Scientifically Criteria For Lower KS2 – Year 3	
Ideas, Questions and Planning	
Ideas and questions	asks relevant questions and uses different types of scientific enquiries to answer them ¹ .
	explains the purposes of a variety of scientific and technological developments ² .
Planning	sets up simple practical enquiries, comparative and fair tests
	begins to make decisions about what observations to make and how long to make them for
Equipment	begins to choose the type of simple equipment that might be used from a reasonable range
	uses appropriate equipment and measurements with reasonable accuracy
Variables	recognises when a simple fair test is needed
	with help, decides how to set up a fair test and control variables
Observing and Presenting Evidence	
Observing and measuring	makes systematic and careful observations
	makes accurate measurements using standard units (e.g. cm, m, °C, N, g, Kg, ml) using a range of equipment, e.g. data loggers and thermometers
Secondary sources	recognises when and how secondary sources (e.g. books, internet, experts, diagrams) might help answer questions that cannot be answered through practical investigations
Recording information and data	gathers and records data in a variety of ways to help in answering questions
	prepares own format for recording data
	makes decisions about how to record and analyse the data
Presenting evidence	records and presents findings using drawings, labelled diagrams, keys, tally charts, Carroll diagrams, Venn diagrams, bar charts and tables

	reports on findings from enquiries, in simple scientific language, using oral and written explanations, displays or presentations of results and conclusions
Considering and Evaluating Evidence	
Looking for patterns	uses observable and other criteria to group, sort and classify in different ways (including simple keys and branching databases)
	identifies differences, similarities or changes related to simple scientific ideas and processes
	with help, looks for changes, patterns, and relationships in their data
Explaining results	with help, uses results to draw simple conclusions and answers questions using appropriate level of knowledge and their own experiences
	uses straightforward scientific evidence to answer questions or to support their findings
Communication	uses relevant scientific language to discuss their ideas and communicate their findings
Evaluating	with support, uses results to suggest improvements to what they have done
	with support, raises further questions (e.g. arising from the data)
	with support, makes predictions for new values within or beyond the data collected

Year 4 Science- Learning Objectives and Knowledge Overview

Y4 Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically (Lower Key Stage 2) <ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • setting up simple practical enquiries, comparative and fair tests 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • identifying differences, similarities or changes related to simple scientific ideas and processes 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> • using straightforward scientific evidence to answer questions or to support their findings. 	Introduce	Revisit	Revisit

Living Things and their Habitats •Recognise that living things can be grouped in a variety of ways		Introduce	Revisit
•Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment		Introduce	Revisit
•Recognise that environments can change and that this can sometimes pose dangers to living things		Introduce	Revisit
Animals (including humans) •Describe the simple functions of the basic parts of the digestive system in humans	Introduce		
•Identify the different types of teeth in humans and their simple functions	Introduce		
•Construct and interpret a variety of food chains, identifying producers, predators and prey	Introduce	Revisit	
States of matter •Compare and group materials together, according to whether they are solids, liquids or gases		Introduce	
•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)		Introduce	
•Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		Introduce	
Sound •Identify how sounds are made, associating some of them with something vibrating	Introduce		
•Recognise that vibrations from sounds travel through a medium to the ear	Introduce		

•Find patterns between the pitch of a sound and features of the object that produced it	Introduce		
•Find patterns between the volume of a sound and the strength of the vibrations that produced it	Introduce		
•Recognise that sounds get fainter as the distance from the sound source increases	Introduce		
Electricity •Identify common appliances that run on electricity			Introduce
•Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers			Introduce
•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			Introduce
•Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit			Introduce
•Recognise some common conductors and insulators, and associate metals with being good conductors			Introduce

Y4 Science - Curriculum	Autumn	Spring	Summer
	<p>Animals (Including Humans)</p> <ul style="list-style-type: none"> •Identify the main organs of humans •Draw and label organs •Make a model of the digestive system in humans. •Study different types and functions of teeth in humans and build up a picture. •Effects of diet on our teeth. Teeth hygiene. <p>Sound</p> <ul style="list-style-type: none"> •Identify how sounds are made (vibrating) using rulers, tuning forks etc. •Investigate drums and percussion instruments that vibrate. Patterns between the pitch and volume of a sound and features of the object that produced it. •Make sound sandwiches How sound travels through a solid object, gas and a liquid. •Make and play own instruments using what they have found about pitch and volume. 	<p>States of Matter</p> <ul style="list-style-type: none"> •Solids, liquids & gases, investigate with a variety of materials. •Investigating gases using fizzy drinks. •Melting and cooling points using chocolate. •Investigating the 3 states of water •Evaporation and condensation (the water cycle). <p>Living things and Habitats</p> <ul style="list-style-type: none"> •Classification keys to group and identify a variety of living things. •Environmental changes: how this can pose dangers to living things. 	<p>Living things and Habitats</p> <ul style="list-style-type: none"> •Identify large and micro habitats •Identify and classify animals •How humans can pose a danger to environments. •Effects on food chains such as producer dying out •Chemicals from fertilizers and weed killers can pollute streams, rivers and the coastline and kill fish, water plants and invertebrates. <p>Electricity:</p> <ul style="list-style-type: none"> •Look at everyday devices that use electricity. •Understand that electricity needs a circuit and a source. •Construct a simple series circuit. •Identify and name basic part of electrical circuit & how a switch works. •Recognise common conductors and insulators.

Year 4 Science- Progression and Assessment

	Year 4 Animals including humans (NC statement regarding food chains moved to living things and their habitats)
Below ARE	<ul style="list-style-type: none"> • identify a wider range of body parts, including some internal organs (large intestine, small intestine, brain, lungs, heart, stomach, oesophagus) • locate and name the different organs in the digestive system • recognise they need to take care of their teeth • name the different types of teeth
Broadly within ARE	<ul style="list-style-type: none"> • describe the role of each organ in the digestive system • describe the simple functions of the basic parts of the digestive system in humans • describe the role of each type of teeth in digestion • identify the different types of teeth in humans and their simple functions • explain how they should look after their teeth and recognise why they need to do so • state that animals have different diets and may have different kinds of teeth
Above ARE	<ul style="list-style-type: none"> • explain why humans do not have a full set of adult teeth at birth • explain why food needs to be broken down • explain why dentists are concerned about the amount of sugar children have • explain how fossilised teeth give us clues about an animals' diet • explain why the teeth of certain types of animals need to be different

	Year 4 Living things and their habitats Including Food chain POS statement from animals including humans
Slightly below ARE	<ul style="list-style-type: none"> • recognise that animals can be grouped into vertebrates and invertebrates • identify that some animals feed on other animals and some on plants • explore ways of grouping living things including animals and plants (flowering and non-flowering) • represent feeding relationships with simple food chains
Broadly within ARE	<ul style="list-style-type: none"> • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that living things can be grouped in a variety of ways • describe some of the characteristics of the vertebrate (fish, mammals, amphibians, reptiles and birds) groups (e.g. warm-blooded, have fur, lay eggs) • group animals into vertebrate (fish, mammals, amphibians, reptiles and birds) and invertebrates groups (snails, slugs, spiders, worms and insects) • recognise that green plants are the ultimate source of food for all animals • recognise that a food chain must always start with a green plant (a producer) • represent feeding relationships within a habitat with food chains beginning with a green plant which 'produces' food for the other organisms • use and understand the terms: producer, predator and prey • construct and interpret a variety of food chains, identifying producers, predators and prey (Teacher Note: statement moved from NC 'Animals including humans' to improve progression within topics) • know the function of some of the more complex features which aid survival in specific habitats (e.g. gills, blubber, camouflage) • describe why different animals and plants live in different habitats • recognise that environments can change and that this can sometimes pose dangers to living things • describe how humans can cause changes to environments • explain that different organisms are found in different habitats because of differences in environmental factors
Above ARE	<ul style="list-style-type: none"> • use food chains to predict what might happen to the numbers of an organism if there are suddenly more predators or less prey • explain why it is necessary to use a reasonably large sample when investigating the preferences of small invertebrates • describe how humans have negatively impacted environments (e.g. pollution, deforestation, introduction of invasive species) • explain why some animals are hard to classify (e.g. platypus, echidna, bat, flightless birds)

	Year 4 Materials- Solids, liquids and gases
Slightly below ARE	<ul style="list-style-type: none"> • name some solids and liquids • state that air is a gas • state some differences between solids, liquids and gases • observe what happens to a variety of materials when they are heated (e.g. chocolate, ice cream, butter, water) • describe what happens to water when it is heated and cooled • recognise that these processes can be reversed • state that ice, water and steam are the same material • identify the processes of melting, freezing, evaporation and condensation
Broadly within ARE	<ul style="list-style-type: none"> • recognise everyday substances as mixtures of solids, liquids and/or gases • recognise that air is a material and that it is one of a range of gases which have important uses • recognise that gases flow from place to place • know that gases can be easily compressed • describe the differences between solids and liquids • compare simple solids and liquids (e.g. in terms of ease of squashing or pouring) • compare and group materials together, according to whether they are solids, liquids or gases • make clear distinctions between the properties of solids, liquids and gases • identify a wide range of contexts in which changes of state take place • describe a few examples where these changes occur • recognise that for a substance to be detected by smell, some of it must be in the gas state • 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) • describe how when ice melts it turns to liquid and how when water freezes it becomes ice • describe how these processes can be reversed • describe how liquids evaporate to form gases and how gases condense to form liquids • sequence the changes that happen in the water cycle • describe the water cycle in terms of these processes • explain the relationship between liquids and solids in terms of melting and freezing • explain the relationship between liquids and gases in terms of evaporation and condensation • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • know that temperature can affect the rate of evaporation or condensation • describe the effect of temperature on evaporation

	<ul style="list-style-type: none"> • explain how changing conditions affects processes such as evaporation and condensation • identify a range of contexts in which changes take place (e.g. evaporation of puddles in the school playground or from clothes on the washing line, condensation in the bathroom)
Above ARE	<ul style="list-style-type: none"> • describe the behaviour and properties of gases • make clear distinctions between the properties of solids, liquids and gases • explain why granular solids have some of the properties associated with liquids • explain why some substances are hard to classify as solids, liquids and gases (e.g. whipped cream, mousse, mayonnaise, muddy water, fizzy drinks, cornflour and water) • compare the boiling point of different liquids • explore the effect of salt on ice • explain why salt is put on the roads in winter

	Year 4 Sound
Slightly below ARE	<ul style="list-style-type: none"> • recognise and describe many sounds and sound sources • state that they hear sounds through their ears • recognise that when sounds are generated by objects, something moves or vibrates • describe differences in pitch and volume • describe what they observe when they move further away from a source of sound
Broadly within ARE	<ul style="list-style-type: none"> • identify how sounds are made, associating some of them with something vibrating • identify what is vibrating in a range of musical instruments • generalise that sounds are produced when objects vibrate • describe how sounds are generated by specific objects • suggest ways of producing sounds • 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 • distinguish between pitch and volume (loudness) • know that altering vibrations alters the pitch or volume • suggest how to change the loudness of the sounds produced by a range of musical instruments • explore how to vary the pitch and volume of sounds from a variety of objects or instruments • 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 • describe what they observe when they move further away from the source of a sound

Above ARE	<ul style="list-style-type: none"> • describe ways in which the pitch of a sound made by a particular instrument or vibrating object can be raised or lowered • generalise the effects of changes on sound (e.g. the tighter the tension the higher the pitch) • group instruments independently by the way sounds are produced • recognise that sounds travel through solids, water and air • explore how sound travels through a variety of materials • identify suitable materials to use for sound insulation • recognise that sound can be reflected from a surface which can cause an echo • describe how some animals use echo-location
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	Year 4 Electricity
Slightly below ARE	<ul style="list-style-type: none"> • identify common appliances that run on electricity • identify mains operated and battery operated devices • describe some of the dangers associated with mains electricity • name some components of a simple electrical circuit • know that batteries are sources of electricity • recognise that for a circuit to work it must be complete • construct a working circuit • identify materials as conductors or insulators
Broadly within ARE	<ul style="list-style-type: none"> • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • make drawings of simple working circuits (pictorial only circuit symbols covered in year 6) • make circuits from drawings provided • 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 • describe the effect of making and breaking one of the contacts on a circuit • explain why some circuits work and others do not • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • describe how switches work • construct a home-made switch • construct simple circuits and use them to test whether materials are electrical conductors or insulators • recognise some common conductors and insulators, and associate metals with being good conductors

Above ARE	<ul style="list-style-type: none">• are methodical in tracing faults in simple circuits• relate knowledge about conductors and insulators to their use in electrical appliances• describe the use of conductors and insulators in components including connecting wires• identify graphite and playdough as non-metal conductors and explain why this is unusual
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Working Scientifically Criteria For Lower KS2 – Year 4	
Ideas, Questions and Planning	
Ideas and questions	asks relevant questions and uses different types of scientific enquiries to answer them ¹.
	explains the purposes of a variety of scientific and technological developments ² .
Planning	sets up simple practical enquiries, comparative and fair tests
	begins to make decisions about what observations to make and how long to make them for
Equipment	begins to choose the type of simple equipment that might be used from a reasonable range
	uses appropriate equipment and measurements with reasonable accuracy
Variables	recognises when a simple fair test is needed
	with help, decides how to set up a fair test and control variables
Observing and Presenting Evidence	
Observing and measuring	makes systematic and careful observations
	makes accurate measurements using standard units (e.g. cm, m, °C, N, g, Kg, ml) using a range of equipment, e.g. data loggers and thermometers
Secondary sources	recognises when and how secondary sources (e.g. books, internet, experts, diagrams) might help answer questions that cannot be answered through practical investigations
Recording information and data	gathers and records data in a variety of ways to help in answering questions
	prepares own format for recording data
	makes decisions about how to record and analyse the data
Presenting evidence	records and presents findings using drawings, labelled diagrams, keys, tally charts, Carroll diagrams, Venn diagrams, bar charts and tables

	reports on findings from enquiries, in simple scientific language, using oral and written explanations, displays or presentations of results and conclusions
Considering and Evaluating Evidence	
Looking for patterns	uses observable and other criteria to group, sort and classify in different ways (including simple keys and branching databases)
	identifies differences, similarities or changes related to simple scientific ideas and processes
	with help, looks for changes, patterns, and relationships in their data
Explaining results	with help, uses results to draw simple conclusions and answers questions using appropriate level of knowledge and their own experiences
	uses straightforward scientific evidence to answer questions or to support their findings
Communication	uses relevant scientific language to discuss their ideas and communicate their findings
Evaluating	with support, uses results to suggest improvements to what they have done
	with support, raises further questions (e.g. arising from the data)
	with support, makes predictions for new values within or beyond the data collected

Year 5 Science- Learning Objectives and Knowledge Overview

Y5 Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically (Upper Key Stage 2) During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: <ul style="list-style-type: none"> •planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 	Introduce	Revisit	Revisit
<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 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •using test results to make predictions to set up further comparative and fair tests 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •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 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •identifying scientific evidence that has been used to support or refute ideas or arguments 	Introduce	Revisit	Revisit
Living things and their habitats Pupils should be taught to: <ul style="list-style-type: none"> •describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird 			Introduce

<ul style="list-style-type: none"> •describe the life process of reproduction in some plants and animals 			Introduce
Animals, including humans Pupils should be taught to: <ul style="list-style-type: none"> •describe the changes as humans develop to old age 			Introduce
Properties and changes of materials Pupils should be taught to: <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 		Introduce	
<ul style="list-style-type: none"> •know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution 		Introduce	
<ul style="list-style-type: none"> •use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating 		Introduce	
<ul style="list-style-type: none"> •give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 		Introduce	
<ul style="list-style-type: none"> •demonstrate that dissolving, mixing and changes of state are reversible changes 		Introduce	
<ul style="list-style-type: none"> •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 		Introduce	
Earth and space Pupils should be taught to: <ul style="list-style-type: none"> •describe the movement of the Earth and other planets relative to the sun in the solar system 	Introduce		

•describe the movement of the moon relative to the Earth	Introduce		
•describe the sun, Earth and moon as approximately spherical bodies	Introduce		
•use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Introduce		
Forces Pupils should be taught to: •explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	Introduce		
•identify the effects of air resistance, water resistance and friction, that act between moving surfaces	Introduce		
•recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	Introduce		

Y5 Science - Curriculum	Autumn	Spring	Summer
	Earth and Space <ul style="list-style-type: none"> •Movement of Earth and other planets in relation to the sun. •Earth and Moon orbits •Proof Earth is spherical •Seasons •Shadows •Phases of the moon •Movement of the moon. •Use of rotation to explain day and night. 	Properties and changes in materials <ul style="list-style-type: none"> •Solids, gases and liquids •Grouping materials based on their properties of solubility and conductivity. •Dissolving investigations Insulating and conducting properties •Separating mixtures 	Living Things and their Habitats <ul style="list-style-type: none"> •Life cycles of a flowering plants •Parts of a flower •Pollination •Seed dispersal •Differences in life cycles between a mammal, an insect, an amphibian and a bird.

	<ul style="list-style-type: none"> •Satellites •Astronauts Forces <ul style="list-style-type: none"> •Gravity •Air and water resistance •Friction •Pulleys and gears •Escape the room •Practical investigations. 	<ul style="list-style-type: none"> •Separating materials •Irreversible changes in materials •Dissolving and rusting investigations 	<ul style="list-style-type: none"> •Asexual reproduction. Animals (including Humans) <ul style="list-style-type: none"> •Puberty •Gestation periods •Changes into old age.
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Year 5 Science- Progression and Assessment

	Year 5 Combined topics: Living things and their habitats including statement from Animals including humans to enable progression within a topic and greater coherence between ideas
Slightly below ARE	<ul style="list-style-type: none"> • sequence the life cycles of a variety of plants and animals • name the parts of a flower • name the parts of the human reproductive system • identify ways in which the appearance of humans changes as they get older • identify some characteristics that will not change with age • recognise stages in growth and development of humans including puberty
Broadly within ARE	<ul style="list-style-type: none"> • recognise the similarities in the life cycles of plants, animals and humans • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the functions of some parts of a flower • describe the main functions of parts of a plant involved in reproduction • describe the processes of sexual and asexual reproduction in plants • describe the simple functions of parts of the human reproductive system • describe the life process of reproduction in some plants and animals • compare methods of seed dispersal • know that most animals reproduce by sexual reproduction

	<ul style="list-style-type: none"> • describe the changes as humans develop to old age (Teacher note: statement taken from year 5 'Animals including humans' programme of study)
Above ARE	<ul style="list-style-type: none"> • compare internal and external fertilisation in animals • explain that living things need to reproduce if the species is to survive • compare gestation periods (pregnancy) of different animals • explain what is unusual about the life cycle of a kangaroo or koala

	Year 5 Materials-Properties of Materials
Slightly below ARE	<ul style="list-style-type: none"> • observe and explore the properties of materials (e.g. hardness, transparency, magnetism, electrical and thermal conductivity) • identify some materials that are good thermal insulators and some everyday uses of these • recognise that metals are both good thermal and good electrical conductors • recognise that salt or sugar dissolves in water but sand won't • recognise that dissolving is a reversible change • recognise that changes of state are reversible • recognise the hazards of burning materials
Broadly within ARE	<ul style="list-style-type: none"> • suggest why particular materials are used for different jobs depending on their properties • 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 • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic <ul style="list-style-type: none"> • name some materials that will and some that will not dissolve in water • recognise that although it is not possible to see a dissolved solid, it remains in the solution • describe melting and dissolving and give everyday examples of each • identify and explore factors that affect the rate at which a solid dissolves • separate an undissolved solid from a liquid by filtering • recognise that an undissolved solid can be separated from liquid by filtering • recognise that a solid can be recovered from a solution by evaporation • describe the properties of mixtures which can be separated by filtration • describe some methods that are used to separate simple mixtures • explain that when solids dissolve they break up so small they can pass through the holes in the filter paper • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

	<ul style="list-style-type: none"> • use knowledge about how a specific mixture can be separated to suggest ways in which other similar mixtures might be separated • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • recognise that some changes can be reversed and some cannot • demonstrate that dissolving, mixing and changes of state are reversible changes • observe and explore a variety of chemical changes (e.g. burning) • identify whether some changes are reversible or not • classify some changes as reversible (<i>e.g. dissolving</i>) and others as irreversible (<i>e.g. burning</i>) • recognise that irreversible changes often make new and useful materials • describe what happens when acid and bicarbonate of soda are mixed • 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 • explain that in some cases the new materials made are gases and identify some evidence for the production of gases (e.g. vigorous bubbling)
Above ARE	<ul style="list-style-type: none"> • describe the difference between melting and dissolving • recognise that inks and dyes are often mixtures of different colours and these can be separated by chromatography • explain why ink or dye moves up the paper in chromatography • describe the properties of new materials (e.g. aerogel, silly putty, wrinkle-free cotton) • explain why some materials are good thermal insulators

Year 5 Earth and Space	
Slightly below ARE	<ul style="list-style-type: none"> • identify and name the components of the solar system (i.e. Sun, Moon, Earth and other planets) • locate the Sun, Earth and other planets in the solar system • recognise that the Earth and other planets orbit the Sun • recall that the Earth takes one year to orbit the Sun • recall that the Earth rotates on its' axis and this takes one day • recognise that the Moon orbits the Earth • recall that a shadow from the Sun changes over the course of a day
Broadly within ARE	<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 • recognise that the Earth, Sun and Moon are spherical and support this with some evidence

	<ul style="list-style-type: none"> • recognise that it is daylight in the part of the Earth facing the Sun • explore and describe how a shadow from the Sun changes over the course of a day • explain in terms of the rotation of the Earth why shadows change and the Sun appears to move across the sky during the course of the day • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky • explain why it is night time in Australia when it is day time in England
Above ARE	<ul style="list-style-type: none"> • explain that gravity is a force of attraction and it is what holds the planets in orbit around the Sun and the Moon in orbit around the Earth • explain that the changes in the appearance of the Moon over a period of 28 days arise from the Moon orbiting the Earth once every 28 days • use simple physical models to explain effects that are caused by the movement of the Earth • explain how ideas about the solar system have changed over time

	Year 5 Forces
Slightly below ARE	<ul style="list-style-type: none"> • identify that force is measured in Newtons • name simple forces such as gravity, friction and air resistance • recognise that more than one force can act on an object • recognise that air resistance slows things down • recognise that friction can be useful or not useful
Broadly within ARE	<ul style="list-style-type: none"> • identify weight as a force • draw force diagrams with arrows showing the direction of forces acting on an object • observe and explore the effect of several forces on objects • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • describe some situations in which there is more than once force acting on an object • describe and explain the motion of some familiar objects in terms of several forces acting on them • identify forces on an object as either balanced or unbalanced • use the terms 'balanced' and unbalanced' when describing several forces on an object • explain that balanced forces on an object cause it to remain stationary or travel at the same speed • explain that unbalanced forces on an object cause it to speed up, change shape or slow down • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • understand that air resistance is the frictional force of air on objects moving through it

	<ul style="list-style-type: none"> • describe some of the factors that increase friction between solid surfaces and increase air and water resistance • describe situations in which frictional forces are helpful as well as those in which frictional forces are unhelpful • explore the effects of levers, pulleys and gears • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect
Above ARE	<ul style="list-style-type: none"> • describe how levers, pulleys and gears are used in everyday life (e.g. having gears can make it easier to pedal a bike, a bottle opener makes it easier to open a bottle lid) • explain how introducing gears onto bikes has changed cycling • compare the tread on bicycle tyres according to how much friction they need • identify streamlined objects and describe why they have been designed in this way (e.g. cycling helmets, formula 1 cars, dolphins)



Working Scientifically Criteria For Upper KS2 – Year 5		Dates
Ideas, Questions and Planning		
Ideas and questions	uses their scientific experiences to explore ideas and raise different types of questions	
	talks about how scientific ideas have developed over time ^{1.}	
	recognises the applications of specific scientific ideas ^{2.}	
Planning	selects and plans different types of scientific enquiries to answer questions ^{3.}	
	makes decisions about what observations to make, what measurements to use, how long to make them for and whether to repeat them	
Equipment	chooses the most appropriate equipment to make measurements	
	explains how to use the equipment accurately	
Variables	recognises when and how to set up comparative and fair tests	
	recognises and controls variables where necessary (e.g. explains which variables need to be controlled and why)	
Observing and Presenting Evidence		
Observing and measuring	takes measurements, in standard units, using a range of scientific equipment, with increasing accuracy and precision ^{4.}	
	takes repeat readings when appropriate	
Secondary sources	recognises which secondary sources will be most useful to research their ideas	
	begins to separate opinion from fact	
	records data and results of increasing complexity	

Recording information and data	decides how to record data from a choice of familiar approaches	
	calculates mean value where appropriate	
Presenting Evidence	records and presents findings using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
	reports on findings from enquiries , using relevant scientific language and conventions, in oral and written explanations such as displays and other presentations	
Considering and Evaluating Evidence		
Looking for patterns	uses and develops keys and other information to identify, classify and describe living things and materials	
	identifies conclusions, causal relationships and patterns ⁵ .	
Explaining results	draws valid conclusions, explains and interprets the results (including the degree of trust) using scientific knowledge and understanding (e.g. recognises limitations of data)	
	identifies scientific evidence that has been used to support or refute ideas or	
Communication	uses relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas	
Evaluating	makes practical suggestions about how their working method could be improved (e.g. the effect of sample size on reliability)	
	uses results to identify when further tests and observations might be needed	
	uses test results to make predictions and to set up further comparative and fair tests	

Year 6 Science- Learning Objectives and Knowledge Overview

Y6 Science - Learning Objectives	Autumn	Spring	Summer
Working Scientifically (Upper Key Stage 2) During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: <ul style="list-style-type: none"> •planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 	Introduce	Revisit	Revisit
<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 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •using test results to make predictions to set up further comparative and fair tests 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •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 	Introduce	Revisit	Revisit
<ul style="list-style-type: none"> •identifying scientific evidence that has been used to support or refute ideas or arguments 	Introduce	Revisit	Revisit
Living things and their habitats <ul style="list-style-type: none"> •describe how living things are classified into broad groups according to common observable characteristics 		Introduce	

and based on similarities and differences, including micro-organisms, plants and animals			
•give reasons for classifying plants and animals based on specific characteristics		Introduce	
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			Introduce
•recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function			Introduce
•describe the ways in which nutrients and water are transported within animals, including humans			Introduce
Evolution and inheritance •recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago		Introduce	
•recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents		Introduce	
•identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution		Introduce	
Light •recognise that light appears to travel in straight lines	Introduce		
•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	Introduce		
•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	Introduce		

•use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Introduce		
Electricity •associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit	Introduce		
•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	Introduce		
•use recognised symbols when representing a simple circuit in a diagram	Introduce		

Y6 Science - Curriculum	Autumn	Spring	Summer
	Light •Light travels from a range of sources in straight lines. Reflections – •Non-luminous objects must reflect light •Light travels from the source into our eyes either with or without reflection. •Shiny things reflect light better. Distortions – •How we see different objects Shadows- •Light travels in straight lines	Living Things and their Habitats Classification - Kingdoms •Describe how living things are classified •Using keys to identify animals – •Branch diagrams •Number key diagrams •Flowering and non-flowering classification •Special features and characteristics of vertebrates and invertebrates •Growing yeast experiment Evolution and Inheritance	Animals including Humans • The circulatory system • The digestive system • The effect diet, exercise drugs and lifestyle have on your body

	<ul style="list-style-type: none"> • Shadows have the same shape as the object that cast them • Black out curtain fabric experiment <p>Electricity</p> <p>Circuit diagrams</p> <ul style="list-style-type: none"> • Use recognised symbols when representing a simple circuit in a diagram <p>Changing circuits</p> <ul style="list-style-type: none"> • Compare different circuits • Recognise that the amount of electricity is measured in voltage. • Explore how to change the brightness of bulbs and the volume of a buzzer. • Why do circuits fail? • Explore the effect of thickness of wire in a circuit • Draw series and parallel circuits. 	<ul style="list-style-type: none"> • What characteristics do we inherit? • Animal adaptation in hot and cold places • Changes over time. • The Peppered Moth • Darwin and Finches • The fossilisation process • Evolution of Hominids • Where Homo sapiens evolved from • Famous Scientist – Mary Anning <p>(Continues into Spring Term where necessary)</p>	
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Year 6 Science- Progression and Assessment

	Year 6 Animals including humans
Below ARE	<ul style="list-style-type: none"> • identify and name the parts of the circulatory system • know that the heart is made of muscle • state how to measure pulse rate • recognise that pulse rate is a measure of how fast the heart is beating • identify some of the harmful effects of smoking • identify food as a fuel for the body
Broadly within ARE	<ul style="list-style-type: none"> • describe what the heart and blood vessels do • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • discover that during exercise the heart beats faster to take blood more rapidly to the muscles • make careful measurements of pulse rate • describe the different functions of the blood (e.g. transporting and protecting) • know that the blood comes from the heart in arteries and returns to the heart in veins • know that blood carries oxygen and other essential materials around the body • 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 • recognise that care needs to be taken with medicines and that they can be dangerous • give several reasons why it is sometimes necessary to take medicines • identify some harmful effects of drugs • name the major groups into which food is categorised and identify sources for each group • describe the main function of organs of the human body
Above ARE	<ul style="list-style-type: none"> • explain the effect of diet on particular organs of the body / aspects of health • explain the effect of exercise on particular organs of the body/aspects of health • explain how ideas about the circulatory system have changed over time • explain how ideas about smoking have changed over time • explain why advice on diet changes (e.g. butter vs margarine, five a day, tax on sugary drinks)

	Year 6 Living things and their habitats
Slightly below ARE	<ul style="list-style-type: none"> • recognise that there is a wide variety of living things • identify vertebrates and invertebrates • name and describe the five vertebrate groups • understand there are living things that are too small to be seen and these can affect our lives • recognise that there are many micro-organisms, some which can cause illness or decay
Broadly within ARE	<ul style="list-style-type: none"> • understand why classification is important • 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 • recognise that there are useful micro-organisms which can be used in food production • describe how micro-organisms feed, grow and reproduce like other organisms • describe evidence, from investigations, that yeast is living • explain how micro-organisms can move from one food source to another or from one animal to another
Above ARE	<ul style="list-style-type: none"> • devise own keys to classify organisms and objects • describe early ideas about classification (e.g. Aristotle) • compare the rate of reproduction in microorganisms to other animals • describe how the development of the microscope has contributed to our understanding of microorganisms • describe how ideas about hygiene have changed over time (e.g. Semmelweis)

	Year 6 Evolution and Inheritance
Slightly below ARE	<ul style="list-style-type: none"> • recognise variation in different species (e.g. dogs, horses) • describe how animals and plants are adapted to their environments • recognise that animals have to compete for food • describe how animals avoid predators (e.g. speed, camouflage) • recognise that offspring have some of the features of their parents
Broadly within ARE	<ul style="list-style-type: none"> • 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"> explain how being well adapted to an environment means an organism is more likely to survive recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago explain why we do not have a complete fossil record
Above ARE	<ul style="list-style-type: none"> explain that animals which are better adapted to an environment are more likely to survive, reproduce and pass on characteristics to their offspring meaning the animal species will gradually change and evolve (giraffe with the tallest neck could reach more leaves to feed on) describe the story of the peppered moth and how this provides evidence for natural selection explain how antibiotic resistant bacteria provide evidence for natural selection explain why we can see evidence for natural selection in fast reproducing organisms like bacteria (e.g. antibiotic resistant bacteria and pesticide resistant insects) explain how the introduction of a new species to an isolated environment can affect native species (e.g. Dodo, Kakapo or Stephen's Island Wren) compare the ideas of Darwin and Lamarck about evolution

	Year 6 Light
Slightly below ARE	<ul style="list-style-type: none"> describe reflection as light 'bouncing off' objects explore how light travels using torches and periscopes
Broadly within ARE	<ul style="list-style-type: none"> understand that in order to be seen, all non-luminous objects must reflect light recognise that light appears to travel in straight lines diagrammatically represent light from sources and bouncing off reflective surface using arrows 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 draw diagrams to illustrate how light is travelling from the source to the eye 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 describe a variety of ways of changing the size of the shadow produced by an object describe the relationship between the size of a shadow and the distance between the light source and an object diagrammatically represent the formation of shadows using arrow convention use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Above ARE	<ul style="list-style-type: none"> know that, when sunlight passes through some objects, coloured light is produced (for example in rainbows, soap bubbles and prisms) describe how curved mirrors distort a reflection

	Year 6 Electricity
Slightly below ARE	<ul style="list-style-type: none"> • know that the 'amount' of electricity (voltage) depends on the number of batteries • construct some working series circuits with specified components • recognise conventional circuit symbols
Broadly within ARE	<ul style="list-style-type: none"> • use recognised symbols when representing a simple circuit in a diagram • draw circuit diagrams and construct circuits from diagrams using conventional symbols • explore how to change the brightness of bulbs and the volume of a buzzer • recall what causes the brightness of bulbs or the volume of a buzzer to change • compare different circuits (e.g. for brightness of bulb) • recall that the amount of electricity is measured in voltage • 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
Above ARE	<ul style="list-style-type: none"> • explore the effect of thickness of a wire in a circuit • describe the differences between wires usually used for circuits and fuse wires • describe what would happen if all lights in a home were connected in the same circuit and one broke • explain current in circuits using simple models and analogies (e.g. piped water, bicycle chain, children and sweets)

Working Scientifically Criteria For Upper KS2 – Year 6	
Ideas, Questions and Planning	
Ideas and questions	uses their scientific experiences to explore ideas and raise different types of questions
	talks about how scientific ideas have developed over time ¹ .
	recognises the applications of specific scientific ideas ² .
Planning	selects and plans different types of scientific enquiries to answer questions ³ .
	makes decisions about what observations to make, what measurements to use, how long to make them for and whether to repeat them
Equipment	chooses the most appropriate equipment to make measurements
	explains how to use the equipment accurately
Variables	recognises when and how to set up comparative and fair tests
	recognises and controls variables where necessary (e.g. explains which variables need to be controlled and why)
Observing and Presenting Evidence	
Observing and measuring	takes measurements, in standard units, using a range of scientific equipment, with increasing accuracy and precision ⁴ .
	takes repeat readings when appropriate
Secondary sources	recognises which secondary sources will be most useful to research their ideas
	begins to separate opinion from fact
Recording information and data	records data and results of increasing complexity
	decides how to record data from a choice of familiar approaches
	calculates mean value where appropriate

Presenting Evidence	records and presents findings using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
	reports on findings from enquiries , using relevant scientific language and conventions, in oral and written explanations such as displays and other presentations
Considering and Evaluating Evidence	
Looking for patterns	uses and develops keys and other information to identify, classify and describe living things and materials
	identifies conclusions, causal relationships and patterns ⁵ .
Explaining results	draws valid conclusions, explains and interprets the results (including the degree of trust) using scientific knowledge and understanding (e.g. recognises limitations of data)
	identifies scientific evidence that has been used to support or refute ideas or arguments
Communication	uses relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas
Evaluating	makes practical suggestions about how their working method could be improved (e.g. the effect of sample size on reliability)
	uses results to identify when further tests and observations might be needed
	uses test results to make predictions and to set up further comparative and fair tests