Abbott Community Primary School

Science

Planning, Progression and Assessment Document

January 2024

Using this document:

- Please use this guidance to plan, teach and assess for each individual child's achievement within all areas of Science.
- The aim is for **all** children to **master** the objectives within the appropriate year group, whilst at the same time, having the opportunity for **deeper learning** within these key areas.
- These planned opportunities will enable you to effectively assess the children's achievements, at different points of the academic year.

We aim for all children to acquire the ability to implement the following fundamental characteristics of science:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application in past, present and future technologies.

Please use your informed judgements of ongoing formative and summative assessments, to decide upon a 'best fit' judgement as to whether they have:

- ***acquired and retained the expected knowledge within our curriculum;***
- ***exceeded these expectations;***
- ***are still working towards the goals; or***
- ***cannot access this curriculum.***

Science Long Term Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	Ourselves	Celebrations	Animals	Plants and Growing	Colour	Materials
Year 1	Seasonal Change					
	Animals including Humans		Plants	Materials		
Year 2	Animals including Humans		Living Things and Habitats	Growing Plants		Materials
Year 3	Animals including Humans	Rocks	Forces and Magnets	Plants	Light	
Year 4	Animals including Humans	States of Matter	Electricity	Plants	Sound	
Year 5	Animals including Humans	Living Things and their Habitats	Properties of Materials	Forces	Space	Light (Y6 unit)
Year 6	Animals including Humans	Living Things and their Habitats	Evolution and Inheritance			Electricity

Breadth of Study:

EYFS

The EYFS framework is structured very differently to the National Curriculum as it is organised across seven areas of learning rather than subject areas. The information below aims to show how the procedural knowledge taught across EYFS feeds into National Curriculum objectives. It outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework, Development Matters and Birth to 5 Matters, to match the programme of study for Science.

The most relevant statements for science are taken from the following areas of learning:

- **Communication and Language**
- **Personal, Social and Emotional Development**
- **Understanding the World**

Development Matters (DfE 2020 updated July 2021) Nursery (3-4 Years)	Birth to 5 Matters (2021) (Range 5)
Communication and Language	
• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	• Beginning to understand 'why' and 'how' questions (Range 5)
Personal, Social and Emotional Development	
• Make healthy choices about food, drink, activity and toothbrushing.	•
Understanding the World	
• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	• Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. • Talks about why things happen and how things work . • Developing an understanding of growth, decay and changes over time. • Shows care and concern for living things and the environment. • Begin to understand the effect their behaviour can have on the environment.

<table>
<tr><th>Development Matters
(DfE 2020 updated July 2021)
(Reception)</th><th>Birth to 5 Matters (2021)
(Range 6)</th></tr>
<tr><td colspan="2">Communication and Language</td></tr>
<tr><td>• Learn new vocabulary.
• Ask questions to find out more and to check what has been said to them.
• Articulate their ideas and thoughts in well-formed sentences.
• Describe events in some detail.
• Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
• Use new vocabulary in different contexts.</td><td>• Listens and responds to ideas expressed by others in conversation or discussion.
• understands questions such as who; why; when; where and how.
• Extends vocabulary, especially by grouping and naming, exploring the meaning and sounds of new words
• Uses language to imagine and recreate roles and experiences in play situations.
• Links statements and sticks to a main theme or intention.
• Uses talk to organise, sequence and clarify thinking, ideas, feelings and events.</td></tr>
<tr><td colspan="2">Personal, Social and Emotional Development</td></tr>
<tr><td rowspan="2">Know and talk about the different factors that support their overall health and wellbeing:
• regular physical activity
• healthy eating
• toothbrushing
• sensible amounts of ‘screen time’
• having a good sleep routine
• being a safe pedestrian</td><td>• Shows confidence in choosing resources and perseverance in carrying out a chosen activity.</td></tr>
<tr><td>Physical Development
• Eats a healthy range of foodstuffs and understands need for variety in food.
• Describes a range of different food textures and tastes when cooking and notices changes when they are combined or exposed to hot and cold temperatures.
• Describes physical changes to the body that can occur when feeling unwell, anxious, tired, angry or sad.
• Shows some understanding that good practices with regard to exercise, eating, drinking water, sleeping and hygiene can contribute to good health.
• Shows understanding of how to transport and store equipment safely.
• Practices some appropriate safety measures without direct supervision, considering both benefits and risk of a physical experience.</td></tr>
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Development Matters (DfE 2020 updated July 2021) (Reception)	Birth to 5 Matters (2021) (Range 6)
Understanding the World	
• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.	• Looks closely at similarities, differences, patterns and change in nature. • Knows about similarities and differences in relation to places, objects, materials and living things. • Talks about the features of their own immediate environment and how environments might vary from one another. • Makes observations of animals and plants and explains why some things occur, and talks about changes.

EYFS ELG	**Communication and Language**	**Listening, Attention and Understanding**	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	**Managing Self**	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices
	Understanding the World	**The Natural World**	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

	Key Stage 1	Key Stage 2
Working Scientifically	Across all year groups, scientific knowledge and skills should be learned by working scientifically.	
Biology	**Plants** • Identify, classify and describe their basic structure. • Observe and describe growth and conditions for growth. **Habitats** • Look at the suitability of environments and at food chains. **Animals and Humans** • Identify, classify and observe. • Look at growth, basic needs, exercise, food and hygiene. **All Living Things** • Investigate differences.	**Plants** • Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal. **Evolution and Inheritance** • Look at resemblance in offspring. • Look at changes in animals over time. • Look at adaptation to environments. • Look at differences in offspring. • Look at adaptation and evolution. • Look at changes to the human skeleton over time. **Animals and Humans** • Look at nutrition; transportation of water and nutrients in the body and the muscle; and the skeleton system of humans and animals. • Look at the digestive system in humans. • Look at teeth. • Look at the human circulatory system. **All Living Things** • Identify and name plants and animals. • Look at classification keys. • Look at the life cycle of animals and plants. • Look at classification of plants, animals and microorganisms. • Look at reproduction in plants and animals; and human growth and changes. • Look at the effect of diet, exercise and drugs.

Chemistry	**Materials** • Identify, name, describe, classify and compare properties and changes. • Look at the practical uses of everyday materials.	**Rocks and Fossils** • Compare and group rocks and describe the formation of fossils. **States of Matter** • Look at solids, liquids and gases, changes of state, evaporation, condensation and the water cycle. **Materials** • Examine the properties of materials using various tests. • Look at solubility and recovering dissolved substances. • Separate mixtures. • Examine changes to materials, that create new materials, that are usually not reversible.
Physics	**Forces** • Describe basic movements **Earth and Space** • Observe seasonal changes	**Light** • Look at sources, seeing, reflections and shadows. **Sound** • Look at sources, vibration, volume and pitch. **Electricity** • Look at appliances, circuits, lamps, switches, insulators and conductors. • Look at circuits, the effect of the voltage in cells and the resistance and conductivity of materials. **Forces and Magnets** • Look at contact and distant forces, attraction and repulsion, comparing and grouping materials. • Look at poles, attraction and repulsion. • Look at the effect of gravity and drag forces. • Look at transference of forces in gears, pulleys, levers and springs. **Earth and Space** • Look at the movement of the Earth and the Moon. • Explain day and night.

Progression of Study:

Strand of Science	Concept	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	This concept involves learning the methodologies of the discipline of science.						
Biology	**Understand Plants:** This concept involves becoming familiar with different types of plants, their structure and reproduction.				*plant classification	*plant reproduction /life cycles	*plant adaptation/ evolution/ inheritance
	Understand Animal, Humans and Other Living Things: This concept involves becoming familiar with different types of animals, humans and other living things; the life processes they share, including their habtats.						
	Understand Evolution and Inheritance: This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.	*identify how humans resemble their parents in many features		*identify how plants and animals, including humans, resemble their parents in many features *recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth, millions of years ago *identify how animals and plants are suited to and adapt to their environments in different ways			

*items in italics are not statutory in the English NC, but are addressed within units of work

Progression of Study:

Strand of Science	Concept	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Chemistry	**Investigate Materials:** This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.					*chemistry elements are addressed through scientific experiment	*chemistry elements are addressed through scientific experiment

**items in italics are not statutory in the English NC, but are addressed within units of work*

Progression of Study:

Strand of Science	Concept	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Physics	**Understand Movement, Forces and Magnets:** This concept involves understanding what causes motion.	*notice and describe how things move, using simple comparisons such as faster and slower *Compare how different things move			*forces are addressed through cause and effect during scientific experiment		*D&T link
	Understand Light and Seeing: This concept involves understanding how light and reflection affect sight.	*observe and name a variety of sources of light, including electric lights, flames and the sun, explaining that we see things because light travels from them, to our eyes.			*light from the sun/ how day is caused		
	Investigate Sound and Hearing: This concept involves understanding how sound is produced, how it travels and how it is heard.	*observe and name a variety of sources of sound, noticing that we hear with our ears		*music link		*music link	
	Understand Electrical Circuits: This concept involves understanding circuits and their role in electrical applications.	*identify common appliances that run on electricity *construct a simple series electrical circuit			*D&T link		
	Understand the Earth's Movement in Space: This concept involves understanding whast causes seasonal changes, day and night.		*observe the apparent movement of the sun during the day	*describe the movement of the Earth relative to the Sun, in the solar system *describe the movement of the Moon relative to the earth.			*revision

*items in italics are not statutory in the English NC, but are addressed within units of work

	Key Stage 1	
	Year 1	**Year 2**
Working Scientifically: - This concept involves learning the methodologies of the discipline of science.	**Observing Closely** • Can they talk about what they (see, touch, smell, hear or taste)? • Can they use simple equipment to help them make observations? **Performing Tests** • Can they perform a simple test? • Can they tell other people about what they have done? **Identifying and Classifying** • Can they identify and classify things they observe? • Can they think of some questions to ask? • Can they answer some scientific questions? • Can they give a simple reason for their answers? • Can they explain what they have found out? **Recording Findings** • Can they show their work using pictures, labels and captions? • Can they record their findings using standard units? • Can they put some information in a chart or table?	**Observing Closely** • Can they use <see, touch, smell, hear or taste> to help them answer questions? • Can they use some scientific words to describe what they have seen and measured? • Can they compare several things? **Performing Tests** • Can they carry out a simple fair test? • Can they explain why it might not be fair to compare two things? • Can they say whether things happened as they expected? • Can they suggest how to find things out? • Can they use prompts to find things out? **Identifying and Classifying** • Can they organise things into groups? • Can they find simple patterns (or associations)? • Can they identify animals and plants by a specific criterion, eg, lay eggs or not; have feathers or not? **Recording Findings** • Can they use <text, diagrams, pictures, charts, tables> to record their observations? • Can they measure using <simple equipment>?
	Exceeding expectations: *Can they find out by watching, listening, tasting, smelling and touching?* *Can they give a simple reason for their answers?* *Can they talk about similarities and differences?* *Can they explain what they have found out using scientific vocabulary?* *Can they use ICT to show their working?* *Can they make accurate measurements?*	***Exceeding expectations:*** *Can they suggest ways of finding out through listening, hearing, smelling, touching and tasting?* *Can they say whether things happened as they expected and if not why not?* *Can they suggest more than one way of grouping animals and plants and explain their reasons?* *Can they use information from books and online information to find things out?*

	Key Stage 1	
	Year 1	**Year 2**
Biology – Understand Plants: This concept involves becoming familiar with different types of plants, their structure and reproduction.	• Can they name the petals, stem, leaf, bulb, flower, seed, stem and root of a plant? • Can they identify and name a range of common plants and trees? • Can they recognise deciduous and evergreen trees? • Can they name the trunk, branches and root of a tree? • Can they describe the parts of a plant (roots, stem, leaves, flowers)?	• Can they describe what plants need to survive? • Can they observe and describe how seeds and bulbs grow into mature plants? • Can they find out & describe how plants need water, light and a suitable temperature to grow and stay healthy?
	Exceeding expectations: *Can they name the main parts of a flowering plant, using scientific vocabulary, and describe their functions?*	***Exceeding expectations:*** *Can they describe what plants need to survive and link it to where they are found?* *Can they explain that plants grow and reproduce in different ways?*
Biology – Understand Animal, Humans and Other Living Things: This concept involves becoming familiar with different types of animals, humans and other living things; the life processes they share,	• Can they point out some of the differences between different animals? • Can they sort photographs of living things and non-living things? • Can they identify and name a variety of common animals? (birds, fish, amphibians, reptiles, mammals, invertebrates) • Can they describe how an animal is suited to its environment? • Can they identify and name a variety of common animals that are carnivores, herbivores and omnivores? • Can they name the parts of the human body that they can see? • Can they draw & label basic parts of the human body? • Can they identify the main parts of the human body and link them to their senses? • Can they name the parts of an animal's body? • Can they name a range of domestic animals? • Can they classify animals by what they eat? (carnivore, herbivore, omnivore) • Can they compare the bodies of different animals?	• Can they describe what animals need to survive? • Can they explain that animals grow and reproduce? • Can they explain why animals have offspring which grow into adults? • Can they describe the life cycle of some living things? (e.g. egg, chick, chicken) • Can they explain the basic needs of animals, including humans for survival? (water, food, air) • Can they describe why exercise, balanced diet and hygiene are important for humans? Can they match certain living things to the habitats they are found in? • Can they explain the differences between living and non-living things? • Can they describe some of the life processes common to plants and animals, including humans? • Can they decide whether something is living, dead or non-living? • Can they describe how a habitat provides for the basic needs of things living there? Can they describe a range of different habitats? • Can they describe how plants and animals are suited to their habitat?
	Exceeding expectations: *Can they begin to classify animals according to a number of given criteria?* *Can they point out differences between living things and non-living things?* *Can they name some parts of the human body that cannot be seen?*	***Exceeding expectations:*** *Can they explain that animals reproduce in different ways?* *Can they name some characteristics of an animal that help it to live in a particular habitat?* *Can they describe what animals need to survive and link this to their habitats?*

including their habtats.	*Can they say why certain animals have certain characteristics?* *Can they name a range of wild animals?*	

	Key Stage 1	
	Year 1	**Year 2**
Chemistry – Investigate Materials: This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.	• Can they distinguish between an object and the material from which it is made? • Can they describe materials using their senses? • Can they describe materials using their senses, using specific scientific words? • Can they explain what material objects are made from? • Can they explain why a material might be useful for a specific job? • Can they name some different everyday materials? e.g. wood, plastic, metal, water and rock • Can they sort materials into groups by a given criteria? • Can they explain how solid shapes can be changed by squashing, bending, twisting and stretching?	**Classifying and Grouping Materials** • Can they describe the simple physical properties of a variety of everyday materials? • Can they compare and group together a variety of materials based on their simple physical properties? **Changing Materials** • Can they explore how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching) • Can they find out about people who developed useful new materials? (John Dunlop, Charles Macintosh, John McAdam) • Can they identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses? • Can they explain how things move on different surfaces?
	Exceeding expectations: *Can they describe things that are similar and different between materials?* *Can they explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate?* *Can they explain what happens to certain materials when they are cooled, e.g. jelly, heated chocolate? they name the main parts of a flowering plant, using scientific vocabulary, and describe their functions?*	***Exceeding expectations:*** *Can they describe the properties of different materials using words like, transparent or opaque, flexible, etc.?* *Can they sort materials into groups and say why they have sorted them in that way?* *Can they say which materials are natural and which are man- made?* *Can they explain how materials are changed by heating and cooling?* *Can they explain how materials are changed by bending, twisting and stretching?* *Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted?*

	Key Stage 1	
	Year 1	**Year 2**
Physics – Understand the Earth's Movement in Space: This concept involves understanding whast causes seasonal changes, day and night.	• Can they observe changes across the four seasons? • Can they name the four seasons in order? • Can they observe and describe weather associated with the seasons? • Can they observe and describe how day length varies?	
	Exceeding expectations: Can they observe features in the environment and explain that these are related to a specific season? Can they observe and talk about changes in the weather? Can they talk about weather *variation* in different parts of the world?	

Key Stage 1 TA Framework

Science

Using the science frameworks

- The standard in this framework contains a number of 'pupil can' statements. To judge that a pupil is working at the standard in science, teachers need to have evidence which demonstrates that the pupil meets **all** of the 'working scientifically' statements and **all** of the 'science content' taught in the final year of the key stage.
- There is no requirement to have evidence from the classroom that pupils have met statements relating to science content taught before the final year of the key stage. Where possible, teachers should draw on assessments that have been made earlier in the key stage to make their judgement against this framework.
- The 'working scientifically' statements must be taught through, and clearly related to, the teaching of substantive science content in the programme of study. The 'science content' statements will be taught and assessed throughout the key stage. The framework shows where statements relating to science content appear in the national curriculum.

Working at the expected standard

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions:
  - observing changes over time
  - noticing patterns
  - grouping and classifying things
  - carrying out simple comparative tests
  - finding things out using secondary sources of information
- communicate their ideas, what they do and what they find out in a variety of ways.

Science content

The pupil can:

- name and locate parts of the human body, including those related to the senses [year 1], and describe the importance of exercise, a balanced diet and hygiene for humans [year 2]
- describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults [year 2]
- describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants [year 2]
- identify whether things are alive, dead or have never lived [year 2]
- describe and compare the observable features of animals from a range of groups [year 1]
- group animals according to what they eat [year 1], describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships [year 2]
- describe seasonal changes [year 1]
- name different plants and animals and describe how they are suited to different habitats [year 2]
- distinguish objects from materials, describe their properties, identify and group everyday materials [year 1] and compare their suitability for different uses [year 2].

	Lower Key Stage 2	
	Year 3	**Year 4**
Working Scientifically: - This concept involves learning the methodologies of the discipline of science.	**Planning** • Can they use different ideas and suggest how to find something out? • Can they make and record a prediction before testing? • Can they plan a fair test and explain why it was fair? • Can they set up a simple fair test to make comparisons? • Can they explain why they need to collect information to answer a question? **Obtaining and Presenting Evidence** • Can they measure using different equipment and units of measure? • Can they record their observations in different ways? <labelled diagrams, charts etc> • Can they describe what they have found using scientific language? • Can they make accurate measurements using standard units? **Considering Evidence and Evaluating** • Can they explain what they have found out and use their measurements to say whether it helps to answer their question? • Can they use a range of equipment (including a data-logger) in a simple test?	**Planning** • Can they set up a simple fair test to make comparisons? • Can they plan a fair test and isolate variables, explaining why it was fair and which variables have been isolated? • Can they suggest improvements and predictions? • Can they decide which information needs to be collected and decide which is the best way for collecting it? • Can they use their findings to draw a simple conclusion? **Obtaining and Presenting Evidence** • Can they take measurements using different equipment and units of measure and record what they have found in a range of ways? • Can they make accurate measurements using standard units? • Can they explain their findings in different ways (display, presentation, writing)? **Considering Evidence and Evaluating** • Can they find any patterns in their evidence or measurements? • Can they make a prediction based on something they have found out? • Can they evaluate what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? • Can they use straightforward scientific evidence to answer questions or to support their findings? • Can they identify differences, similarities or changes related to simple scientific ideas or processes?
	Exceeding expectations: *Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables?* *Can they explain their findings in different ways (display, presentation, writing)?* *Can they use their findings to draw a simple conclusion?* *Can they suggest improvements and predictions for further tests?* *Can they suggest how to improve their work if they did it again?*	***Exceeding expectations:*** *Can they plan and carry out an investigation by controlling variables fairly and accurately?* *Can they use test results to make further predictions and set up further comparative tests?* *Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?* *Can they report findings from investigations through written explanations and conclusions?* *Can they use a graph or diagram to answer scientific questions?*

	Lower Key Stage 2	
	Year 3	**Year 4**
Biology – Understand Plants: This concept involves becoming familiar with different types of plants, their structure and reproduction.	• Can they identify and describe the functions of different parts of flowering plants? (roots, stem/trunk, leaves and flowers)? • Can they explore the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow)? • Can they explain how they vary from plant to plant? • Can they investigate the way in which water is transported within plants? • Can they explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal?	
	Exceeding expectations: *Can they classify a range of common plants according to many criteria (environment found, size, climate required, etc.)?*	
Biology – Understand Animal, Humans and Other Living Things: This concept involves becoming familiar with different types of animals, humans and other living things; the life processes they share,	• Can they explain the importance of a nutritionally balanced diet? • Can they describe how nutrients, water and oxygen are transported within animals and humans? • Can they identify that animals, including humans, cannot make their own food: they get nutrition from what they eat? • Can they describe and explain the skeletal system of a human? • Can they describe and explain the muscular system of a human?	• Can they identify and name the basic parts of the digestive system in humans? • Can they describe the simple functions of the basic parts of the digestive system in humans? • Can they identify the simple function of different types of teeth in humans? • Can they compare the teeth of herbivores and carnivores? • Can they explain what a simple food chain shows? • Can they construct and interpret a variety of food chains, identifying producers, predators and prey? • Can they recognise that living things can be grouped in a variety of ways? • Can they explore and use a classification key to group, identify and name a variety of living things? (plants, vertebrates, invertebrates) • Can they compare the classification of common plants and animals to living things found in other places? (under the sea, prehistoric) • Do they recognise that environments can change and this can sometimes pose a danger to living things?
	Exceeding expectations: *Can they explain how the muscular and skeletal systems work together to create movement?* *Can they classify living things and non-living things by a number of characteristics that they have thought of?*	***Exceeding expectations:*** *Can they classify living things and non-living things by a number of characteristics that they have thought of?* *Can they explain how people, weather and the environment can affect living things?*

including their habtats.	*Can they explain how people, weather and the environment can affect living things?* *Can they explain how certain living things depend on one another to survive?*	*Can they explain how certain living things depend on one another to survive?* Can they give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment? Can they explore the work of pioneers in classification? (e.g. Carl Linnaeus) Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore)

	Lower Key Stage 2	
	Year 3	**Year 4**
Chemistry – Investigate Materials: This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.	**Rocks and Soils** • Can they compare and group together different rocks on the basis of their appearance and simple physical properties? • Can they describe and explain how different rocks can be useful to us? • Can they describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed? • Can they describe in simple terms how fossils are formed when things that have lived are trapped within rock? • Can they recognise that soils are made from rocks and organic matter?	**States of Matter** • Can they compare and group materials together, according to whether they are solids, liquids or gases? • Can they explain what happens to materials when they are heated or cooled? • Can they measure or research the temperature at which different materials change state in degrees Celsius? • Can they use measurements to explain changes to the state of water? • Can they identify the part that evaporation and condensation has in the water cycle? • Can they associate the rate of evaporation with temperature?
	Exceeding expectations: *Can they classify igneous and sedimentary rocks?* *Can they begin to relate the properties of rocks with their uses?*	***Exceeding expectations:*** Can they group and classify a variety of materials according to the impact of temperature on them? Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line? Can they relate temperature to change of state of materials?

	Lower Key Stage 2	
	Year 3	**Year 4**
Physics – Understand Movement, Forces and Magnets: This concept involves understanding what causes motion.	• Can they compare how things move on different surfaces? • Can they observe that magnetic forces can be transmitted without direct contact? • Can they observe how some magnets attract or repel each other? • Can they classify which materials are attracted to magnets and which are not? • Can they notice that some forces need contact between two objects, but magnetic forces can act at a distance? • Can they compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet? • Can they identify some magnetic materials? • Can they describe magnets have having two poles (N & S)? • Can they predict whether two magnets will attract or repel each other depending on which poles are facing?	
	Exceeding expectations: *Can they investigate the strengths of different magnets and find fair ways to compare them?*	
Physics – Understand Light and Seeing: This concept involves understanding how light and reflection affect sight.	• Can they recognise that they need light in order to see things? • Can they recognise that dark is the absence of light? • Can they notice that light is reflected from surfaces? • Can they recognise that light from the sun can be dangerous and that there are ways to protect their eyes? • Can they recognise that shadows are formed when the light from a light source is blocked by a solid object? • Can they find patterns in the way that the size of shadows change?	
	Exceeding expectations: *Can they explain why lights need to be bright or dimmer according to need?* *Can they explain the difference between transparent, translucent and opaque?* *Can they explain why lights need to be bright or dimmer according to need?* *Can they make a bulb go on and off?* *Can they say what happens to the electricity when more batteries are added?*	

	Can they explain why their shadow changes when the light source is moved closer or further from the object?	
Physics – Investigate Sound and Hearing: This concept involves understanding how sound is produced, how it travels and how it is heard.		• Can they describe a range of sounds and explain how they are made? • Can they associate some sounds with something vibrating? • Can they compare sources of sound and explain how the sounds differ? • Can they explain how to change a sound (louder/softer)? • Can they recognise how vibrations from sound travel through a medium to a ear? • Can they find patterns between the pitch of a sound and features of the object that produce it? • Can they find patterns between the volume of the sound and the strength of the vibrations that produced it? • Can they recognise that sounds get fainter as the distance from the sound source increases? • Can they explain how you could change the pitch of a sound? • Can they investigate how different materials can affect the pitch and volume of sounds?
		Exceeding expectations: Can they explain why sound gets fainter or louder according to the distance? Can they explain how pitch and volume can be changed in a variety of ways? Can they work out which materials give the best insulation for sound?
Physics – Understand Electrical Circuits: This concept involves understanding circuits and their role in electrical applications.		• Can they identify common appliances that run on electricity? • Can they construct a simple series electric circuit? • Can they identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers? • Can they 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? • Can they recognise that a switch opens and closes a circuit? • Can they associate a switch opening with whether or not a lamp lights in a simple series circuit? • Can they recognise some common conductors and insulators? • Can they associate metals with being good conductors?
		Exceeding expectations: Can they explain how a bulb might get lighter? Can they recognise if all metals are conductors of electricity?

		Can they work out which metals can be used to connect across a gap in a circuit? Can they explain why cautions are necessary for working safely with electricity?

	Upper Key Stage 2	
	Year 5	**Year 6**
Working Scientifically: - This concept involves learning the methodologies of the discipline of science.	**Planning** • Can they plan and carry out a scientific enquiry to answer questions, including recognising and controlling variables where necessary? • Can they make a prediction with reasons? • Can they use test results to make predictions to set up comparative and fair tests? • Can they present a report of their findings through writing, display and presentation? **Obtaining and Presenting Evidence** • Can they take measurements using a range of scientific equipment with increasing accuracy and precision? • Can they take repeat readings when appropriate? • Can they record more complex data and results using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs? • **Considering Evidence and Evaluating** • Can they report and present findings from enquiries through written explanations and conclusions? • Can they use a graph to answer scientific questions?	**Planning** • Can they explore different ways to test an idea, choose the best way, and give reasons? • Can they vary one factor whilst keeping the others the same in an experiment? Can they explain why they do this? • Can they plan and carry out an investigation by controlling variables fairly and accurately? • Can they make a prediction with reasons? • Can they use information to help make a prediction? • Can they use test results to make further predictions and set up further comparative tests? • Can they explain, in simple terms, a scientific idea and what evidence supports it? • Can they present a report of their findings through writing, display and presentation? • **Obtaining and Presenting Evidence** • Can they explain why they have chosen specific equipment? (incl ICT based equipment) • Can they decide which units of measurement they need to use? • Can they explain why a measurement needs to be repeated? • Can they record their measurements in different ways? (incl bar charts, tables and line graphs) • Can they take measurements using a range of scientific equipment with increasing accuracy and precision? **Considering Evidence and Evaluating** • Can they find a pattern from their data and explain what it shows? • Can they use a graph to answer scientific questions? • Can they link what they have found out to other science? • Can they suggest how to improve their work and say why they think this?

		• Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? • Can they report findings from investigations through written explanations and conclusions? • Can they identify scientific evidence that has been used to support to refute ideas or arguments? • Can they report and present 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?
	Exceeding expectations: *Can they explore different ways to test an idea, choose the best way and give reasons?* *Can they vary one factor whilst keeping the others the same in an experiment?* *Can they use information to help make a prediction?* *Can they explain, in simple terms, a scientific idea and what evidence supports it?* *Can they decide which units of measurement they need to use?* *Can they explain why a measurement needs to be repeated?* *Can they find a pattern from their data and explain what it shows?* *Can they link what they have found out to other science?* *Can they suggest how to improve their work and say why they think this?*	***Exceeding expectations:*** *Can they choose the best way to answer a question?* *Can they use information from different sources to answer a question and plan an investigation?* *Can they make a prediction which links with other scientific knowledge?* *Can they identify the key factors when planning a fair test?* *Can they explain how a scientist has used their scientific understanding plus good ideas to have a breakthrough?* *Can they plan in advance which equipment they will need and use it well?* *Can they make precise measurements?* *Can they collect information in different ways?* *Can they record their measurements and observations systematically?* *Can they explain qualitative and quantitative data?* *Can they draw conclusions from their work?* *Can they link their conclusions to other scientific knowledge?* *Can they explain how they could improve their way of working?*

	Upper Key Stage 2	
	Year 5	**Year 6**
Biology – Understand Animal, Humans and Other Living Things: This concept involves becoming familiar with different types of animals, humans and other living things; the life processes they share, including their habtats.	• Can they describe the changes as humans develop to old age? • Can they describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird? • Can they describe the life cycles of common plants? • Can they explore the work of well know naturalists and animal behaviourists? (David Attenborough and Jane Goodall)	• Can they describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences including microorganisms, plants and animals? • Can they give reasons for classifying plants and animals based on specific characteristics? • Can they identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood? • Can they recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function? • Can they describe the ways in which nutrients and water and transported within animals, including humans?
	Exceeding expectations: *Can they create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies?* *Can they describe the changes experienced in puberty?* *Can they draw a timeline to indicate stages in the growth and development of humans?* Can they observe their local environment and draw conclusions about life-cycles, e.g. plants in the vegetable garden or flower border? Can they compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests?	***Exceeding expectations:*** *Can they explain why classification is important?* *Can they readily group animals into reptiles, fish, amphibians, birds and mammals?* *Can they sub divide their original groupings and explain their divisions?* *Can they group animals into vertebrates and invertebrates?* *Can they find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification?* Can they explore the work of medical pioneers, for example, William Harvey and Galen and recognise how much we have learnt about our bodies? Can they compare the organ systems of humans to other animals? Can they make a diagram of the human body and explain how different parts work and depend on one another? Can they name the major organs in the human body? Can they locate the major human organs? Can they make a diagram that outlines the main parts of a body?
Biology – Understand Evolution and Inheritance:		• Can they recognise that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago? • Can they recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents? • Can they give reasons why offspring are not identical to each other or to their parents? • Can they explain the process of evolution and describe the evidence for this?

This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.		• Can they identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution?
		Exceeding expectations: *Can they talk about the work of Charles Darwin, Mary Anning and Alfred Wallace?* *Can they explain how some living things adapt to survive in extreme conditions?* *Can they analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet?* *Can they begin to understand what is meant by DNA?*

	Upper Key Stage 2	
	Year 5	**Year 6**
Chemistry – Investigate Materials: This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.	• Can they compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets? • Can they explain how some materials dissolve in liquid to form a solution? • Can they describe how to recover a substance from a solution? • Can they use their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, evaporating? • Can they give reasons, based on evidence for comparative and fair tests for the particular uses of everyday materials, including metals wood and plastic? • Can they describe changes using scientific words? (evaporation, condensation) • Can they demonstrate that dissolving, mixing and changes of state are reversible changes? • Can they explain that some changes result in the formation of new materials, and that this kid of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda? • Can they use the terms 'reversible' and 'irreversible'?	
	Exceeding expectations: *Can they describe methods for separating mixtures? (filtration, distillation)* *Can they work out which materials are most effective for keeping us warm or for keeping something cold?* *Can they use their knowledge of materials to suggest ways to classify? (solids, liquids, gases)* *Can't hey explore changes that are difficult to reverse, e.g. burning, rusting and reactions such as vinegar with bicarbonate of soda?* *Can they explore the work of chemists who created new materials, e.g. Spencer Silver (glue on sticky notes) or Ruth Benerito (wrinkle free cotton)?*	

	Upper Key Stage 2	
	Year 5	**Year 6**
Physics – Understand Movement, Forces and Magnets: This concept involves understanding what causes motion.	• Can they explain that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object? • Can they identify the effects of air resistance, water resistance and friction that act between moving surfaces? • Can they recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect?	
	Exceeding expectations: *Can they describe and explain how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction)* *Can they design very effective parachutes?* *Can they work out how water can cause resistance to floating objects?* *Can they explore how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation?*	
Physics – Understand Light and Seeing: This concept involves understanding how light and reflection affect sight.		• Can they recognise that light appears to travel in straight lines? • Can they 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? • Can they explain that we see things because light travels from light sources to our eyes or from light sources to object s and then to our eyes? • Can they use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them?
		Exceeding expectations: *Can they explain how different colours of light can be created?* *Can they use and explain how simple optical instruments work? (periscope, telescope, binoculars, mirror, magnifying glass, Newton's first reflecting telescope)* *Can they explore a range of phenomena, including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters?*
Physics – Understand Electrical Circuits:		• Can they identify and name the basic parts of a simple electric series circuit? (cells, wires, bulbs, switches, buzzers) • Can they compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches? • Can they use recognised symbols when representing a simple circuit in a diagram?

This concept involves understanding circuits and their role in electrical applications.		***Exceeding expectations:*** Can they make their own traffic light system or something similar? Can they explain the danger of short circuits? Can they explain what a fuse is? Can they explain how to make changes in a circuit? Can they explain the impact of changes in a circuit? Can they explain the effect of changing the voltage of a battery?
Physics – Understand the Earth's Movement in Space: This concept involves understanding whast causes seasonal changes, day and night.	• Can they identify and explain the movement of the Earth and other plants relative to the sun in the solar system? • Can they explain how seasons and the associated weather is created? • Can they describe and explain the movement of the Moon relative to the Earth? • Can they describe the sun, earth and moon as approximately spherical bodies? • Can they use the idea of the earth's rotation to explain day and night and the apparent movement of the sun across the sky?	
	Exceeding expectations: Can they compare the time of day at different places on the earth? Can they create shadow clocks? Can they begin to understand how older civilizations used the sun to create astronomical clocks, e.g. Stonehenge? Can they explore the work of some scientists? (Ptolemy, Alhazen, Copernicus)	

Key Stage 2 TA Framework

Science

Using the science frameworks

- The standard in this framework contains a number of 'pupil can' statements. To judge that a pupil is working at this standard in science, teachers need to have evidence which demonstrates that the pupil meets **all** of the 'working scientifically' statements and **all** of the 'science content' taught in the final year of the key stage.
- There is no requirement to have evidence from the classroom that pupils have met statements relating to science content taught before the final year of the key stage. Where possible, teachers should draw on assessments that have been made earlier in the key stage to make their judgement against this framework.
- The 'working scientifically' statements must be taught through, and clearly related to, the teaching of substantive science content in the programme of study. The 'science content' statements will be taught and assessed throughout the key stage. The framework shows where statements relating to science content appear in the national curriculum.

Working at the expected standard

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources
- ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)
- use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
- record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- raise further questions that could be investigated, based on their data and observations.

Science content

The pupil can:

- name and describe the functions of the main parts of the digestive [year 4], musculoskeletal [year 3] and circulatory systems [year 6]; and describe and compare different reproductive processes and life cycles in animals [year 5]
- describe the effects of diet, exercise, drugs and lifestyle on how the body functions [year 6]
- name, locate and describe the functions of the main parts of plants, including those involved in reproduction [year 5] and transporting water and nutrients [year 3]

Continued on the next page

- use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods [year 6]
- construct and interpret food chains [year 4]
- describe the requirements of plants for life and growth [year 3]; and explain how environmental changes may have an impact on living things [year 4]
- use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved [year 6]; and describe how fossils are formed [year 3] and provide evidence for evolution [year 6]
- group and identify materials [year 5], including rocks [year 3], in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties [year 5]
- describe the characteristics of different states of matter and group materials on this basis; and describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle [year 4]
- identify and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components [year 5]
- identify, with reasons, whether changes in materials are reversible or not [year 5]
- use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects [year 6], and the formation [year 3], shape [year 6] and size of shadows [year 3]
- use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard [year 4]
- describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source [year 4]
- describe the effects of simple forces that involve contact (air and water resistance, friction) [year 5], that act at a distance (magnetic forces, including those between like and unlike magnetic poles) [year 3], and gravity [year 5]
- identify simple mechanisms, including levers, gears and pulleys, that increase the effect of a force [year 5]
- use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams [year 6]
- describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night [year 5].

Characteristics of Mastery & Depth

Interdependence	Can apply the skill or knowledge without recall to the teacher.
Fluency	Can apply the skill and knowledge with a high level of confidence.
Application	Can apply the skill and knowledge to a range of different contexts, including other areas of the curriculum.
Consistency	Will be consistent in their use of the skills and understanding
Synthesise	Can organise ideas, information, or experiences into new, more complex interpretations and relationships and make decisions as to when to use different skills
Re-visit	Can come back to this aspect of learning after a break and still feel confident that they can work on the skill and knowledge without difficulty.