Upper Nidderdale Primary Federation

Science

Intent, Implementation and Impact
Long Term Plans & Progression
EYFS, KS1 and KS2 – updated September 2023

At Upper Nidderdale Primary Federation, we will all approach everything we do in the CHAMPS way, help every child flourish into a caring, confident and resilient young person who has a **love of learning** and:

Chooses the right way and takes **responsibility** for their own actions
Honest in everything they do and shows **compassion** for others
Achieves the best they can with the talents they have and develop their **wisdom**
Manners shown to everyone and treats everyone with **respect**
Perseveres when situations are difficult and shows **courage** when they are challenged
Safety and knowing how to keep safe on and offline to ensure that everyone is kept physically and emotionally safe. This shows the special relationship we have with each other, where as a **community,** we look after each other, keeping each other safe – **Koinonia**

As Rights Respecting schools, our intents are based around the following articles;

Article 23

You have the right to special education if you have a disability.

Article 28

All children have the right to a good quality education.

Article 29

All children have the right to an education that helps to develop their talents and abilities.

Science

Intent:

"Children are naturally curious. Science at primary school should nurture this curiosity and allow them to ask questions and develop the skills they need to answer those questions."
Louise Stubberfield

Science teaching at Glasshouses School aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future.

At Glasshouses School, scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Topics, such as Plants, are taught in Key Stage One and studied again in further detail throughout Key Stage Two. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory. Enjoyment of Science is further promoted through our Outdoor Education and through weekly STEM activities.

All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Science

Ofsted Research Review Series: Science – June 2021

Children start on their Science education journey in the EYFS. The September 2021 EYFS Framework has the strand of 'Understanding the World - 'The Natural World' which sets out clear, identifiable scientific knowledge that children will learn. It also provides a number of rich contexts for pupils to learn a wide range of vocabulary.

The State of Nation' report in primary Science in 2020 raised concerns about science being squeezed out of the primary curriculum and not enough time given in a week to the quality teaching of primary science. Ofsted's own report into Science found a similar picture; that the amount of time spent on English and Maths significantly reduced the time available to teach Science, which led in turn to a narrowing of the curriculum.
To ensure that this is not the case in our schools, we ensure that there is a minimum of 1 and a half hours a week will be spent teaching Science. On some occasions this time will be blocked together.

Science

Ofsted Research Review Series: Science – June 2021

A recent report from The Ogden Trust and the University of Manchester found that the teaching of primary science is often reduced to fun activities without developing a deep understanding of the associated scientific concepts.

To ensure that this does not happen across our schools we will deliver a high quality science curriculum that not only identifies the important concepts and procedures for pupils to learn, it also plans how pupils will build knowledge of these over time, with opportunities to recall and revisit key areas. This will start in the early years. Our curriculum is organised so that pupils' knowledge of concepts develops from component knowledge that is carefully sequenced. We have carefully designed our curriculum so that new knowledge is broken down into meaningful components and introduced sequential. This approach ensures that the curriculum is accessible to all pupils, regardless of ability.

By planning to recall, revisit and then build onto prior knowledge, our curriculum is coherent. This journey starts in the early years when pupils are introduced to a wide range of vocabulary and phenomena. As pupils progress through our science curriculum, new knowledge gets systematically integrated into pre-existing knowledge. Revisiting will not involve repetition of previously taught knowledge, this will be remembered and become apart of their emerging conceptual structure.

Science

Ofsted Research Review Series: Science – June 2021

Ofsted define knowledge in Science as;

Substantive Knowledge - Knowledge of the products of Science such as concepts, laws, theories and models. This is referred to as scientific knowledge and conceptual understanding in the national curriculum

Disciplinary Knowledge – This is specified in the working scientifically section of the National Curriculum and it includes knowing how to carry out practical procedures.

Research shows that disciplinary knowledge is often framed as only 'skills' in school curriculums and pupils are assumed to pick these skills up by doing. However, this assumption fails to recognise that disciplinary thinking and carrying out practical investigations skilfully are dependent upon a domain of knowledge.

Our Science Curriculum is organised in the three scientific subject disciplines of Biology, Chemistry and Physics. Each scientific discipline gives pupils a unique perspective to explain the world around them.

Pupils need opportunities in lessons to recap and to orally rehearse and structure their thoughts, using scientific language. This is important in helping them to use scientific language clearly and precisely before writing it.

Science

Ofsted Research Review Series: Science – June 2021

High quality Science education should have the following features;

- **The curriculum is planned to build increasingly sophisticated knowledge of products (substantive knowledge) and practices (disciplinary knowledge) of Science.**
- **Disciplinary knowledge (identified as working scientifically) comprises of knowledge of concepts as well as procedures.**
- **Pupils are not expected to acquire disciplinary knowledge simply as a by-product of taking part in practical activities. Disciplinary knowledge is taught.**
- **Scientific processes such as observation, classification or identifying variables are always taught in relation to specific substantive knowledge.**
- **Knowledge is sequenced to make the deep structure of the scientific disciplines explicit.**
- **Once disciplinary knowledge is introduced, it is used and developed in a range of different substantive contexts.**
- **Sufficient curriculum time is allocated for pupils to embed what they have learned in long-term memory through extensive practice before moving on to new content.**
- **The curriculum is sequenced so that pupils have the necessary disciplinary and substantive knowledge to carry out practical work successfully and learn from it.**
- **The purpose of practical work is clear in relation to curriculum content so that practical activities can be set up and managed to develop pupils' disciplinary and/or substantive knowledge.**
- **Teaching takes account of the limited working-memory capacity of pupils when planning lessons.**
- **Teachers use systematic teaching approaches, where learning is scaffolded using carefully sequenced explanations, models, analogies and other representations to help pupils to acquire, organise and remember scientific knowledge.**
- **Pupils will have regular opportunities in the early years and primary classrooms to learn vocabulary through story and non-fiction books, rhymes, songs and oral rehearsal.**
- **Feedback is focused on the science content and not on generic features. Teachers have sufficient subject knowledge to be able to do this.**
- **Pupils regularly retrieve knowledge from memory to help them to remember and organise their knowledge. This is coupled with feedback.**

Science

Implementation:

Teachers are provided with an additional three planning days per year in addition to their PPA, to plan their curriculum together as a team. As part of this planning process, teachers need to plan the following:

- **A knowledge organiser which outlines knowledge (including vocabulary) all children must master;**
- **A cycle of lessons for each subject, which carefully plans for progression and depth;**
- **A low stakes quiz which is tested regularly to support learners' ability to block learning and increase space in the working memory;**
- **Challenge questions for pupils to apply their learning in a philosophical/open manner;**
- **Developing Experts is used for resources and to develop teacher knowledge.**
- **Trips and visits from experts who will enhance the learning experience;**
- To encourage puils to think, read and write like scientisits, they are introduced to a variety of famous scientists in the context of the area of the area of science that they are learning about.

Impact:

Our Science Curriculum is high quality, well thought out and is planned to demonstrate progression. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:

- **A reflection on standards achieved against the planned outcomes;**
- **A celebration of learning for each term which demonstrates progression across the school;**
- **Tracking of knowledge in pre and post learning quizzes;**

Science

Implementation:

Teachers are provided with an additional three planning days per year in addition to their PPA, to plan their curriculum together as a team. As part of this planning process, teachers need to plan the following:

- **A knowledge organiser which outlines knowledge (including vocabulary) all children must master; This will make the 'sticky knowledge' from a unit of work explicit to the children and their parents.**
- **A cycle of lessons for each subject, which carefully plans for progression and depth;**
- **A low stakes quiz which is tested regularly to support learners' ability to block learning and increase space in the working memory;**
- **Challenge questions for pupils to apply their learning in a philosophical/open manner;**
- **Developing Experts is used for resources and to develop teacher knowledge.**
- **Trips and visits from experts who will enhance the learning experience;**
- **To encourage pupils to think, read and write like scientists, they are introduced to a variety of famous scientists in the context of the area of the area of science that they are learning about.**
- **Explicit links are made to other areas of the curriculum, for example, measuring or recording results (graphs etc.). Pupils are explicitly taught that they are using the skills and knowledge gained in Maths to support their work in Science.**

SEND Adaptions for Science

Cognition and Learning		Communication and Interaction	
Subject Challenges for SEND	SEND Provision	Subject Challenges for SEND	SEND Provision
The ability to explain a scientific concept/provide reasoning to explain a thought or opinion. The ability to recall basic scientific information e.g. the five groups of animals (mammals, fish, birds, reptiles and amphibians). Understanding of subject specific vocabulary. Difficulty in producing accurate pieces of writing e.g. an explanatory text of a scientific concept. Understanding 'abstract'	Use stem sentences to provide subject specific language in a particular format – this will enable children to accurately communicate their thoughts and opinions. Pre-teach can be used to revisit key scientific information as well as planned retrieval questions. The use of 'hooks' at the beginning of lessons informed by previous gap analysis should revisit objectives children are not secure with. Pre-teach subject specific vocabulary e.g. dependent/independent variables. Draw particular attention to subject specific vocabulary which could be viewed as ambiguous. E.g. 'results table' or 'culture.' Support the understanding of key vocabulary through definitions/visual aids. Use writing frames, 'fill in the blank' sentences, sentence starters, vocabulary mats, visuals to sequence etc. Children who have difficulties structuring their writing/who have difficulties with short term memory could use talking tins to 'hold their sentences' whilst they write at an individual word pace. Children can record work differently e.g. through the use of ICT (PowerPoints, Word documents, videos etc). Where possible, begin the lesson by using concrete resources before you discuss the abstract scientific reasoning behind. For example, make a circuit with a bulb, battery and wires before you discuss the concept of electricity/drop different shapes objects before	Expressing themselves and sharing their thoughts and opinions orally. Acquiring, comprehending and using scientific language. EAL pupils may find it difficult to access resources/learning.	Use stem sentences to provide subject specific language in a particular format – this will enable children to accurately communicate their thoughts and opinions. Use alternative recording devices e.g. whiteboards/iPads/talking tins to allow children the option of sharing their thoughts and opinions in an alternative way. Allow children processing time when asking them a direct question. Some children need upwards of 10 seconds to process a question before they can answer. Use visuals to support children in using the correct scientific name for apparatus. Widgit Online can support with creating visuals. Create flashcards with the common name for an object on one side and the scientific name on the other side. E.g. taste buds/fungiform papillae Use a reduced number of simple instructions which are supported by visuals. Appropriate modelling to aid understanding. Differentiated written resources can be supported by visuals and could be translated using Word. (Teachers click Review – Translate – Translate Document). This will fully translate the document and open in a new window.

SEND Adaptions for Science

Sensory and Physical		SEMH	
Subject Challenges for SEND	SEND Provision	Subject Challenges for SEND	SEND Provision
Physical difficulties accessing specific environments during RE trips to places of worship.	Ensure that any environments visited during school trips are fully accessible for children with physical disabilities e.g. wheelchair accessible. Ensure that alternative transport arrangements are made for any children who have a physical disability which makes walking difficult. Above information should be identified on risk assessment prior to visit.	The acceptance that others have different religious views and that they have a right to hold and express them. This can be particularly difficult for pupils with ASD.	Use a multi-sensory approach to teaching religious concepts e.g. through drama and role play. This will make concepts unfamiliar to themselves less abstract. Trips to different places of worship/visitors from different faiths will similarly make unfamiliar concepts less abstract.
Children with a visual impairment may find it difficult to view text/images/religious artefacts.	Ensure that font size used in resources matches the specific font size specified in the child's report provided by the Visual Impairment Team (saved in SEND files on T Share). Enlarge images to appropriate sizes to aid access. Use a visualiser to enlarge an artefact to ensure that children with visual impairments can observe religious artefacts.	Difficulties with social skills may result in children finding group work challenging.	Carefully consider seating arrangements during group work to ensure that children are placed next to patient, non-dominant children. Additional adult support can be deployed as necessary. Ensure children have access to usual aides such as ear defenders to reduce noise. Provide talking tins for children who struggle with impulsivity so that they can record their contributions as they think of them but can play them back to other children at the appropriate time.
		Distress caused by exposure to unfamiliar environments during trips/fieldwork.	Children to be prepared for change of environment via Social Stories, identification of change on visual timetable and photos/videos of environment to reduce anxiety caused by lack of familiarity.

RHSE Objectives linked to Science

The Changing Adolescent Body February 2021 – Statutory RHSE guidance
Know key facts about puberty and the changing adolescent body, particularly from age 9 through to 11, including physical and emotional changes.
Know about menstrual wellbeing including the key facts about the menstrual cycle.

Health & Prevention February 2021 – Statutory RHSE guidance
Know how to recognise early signs of physical illness, such as weight loss, or unexplained changes to the body.
Know about safe and unsafe exposure to the sun, and how to reduce the risk of sun damage, including skin cancer.
Know the importance of sufficient good quality sleep for good health and that lack of sleep can affect weight, mood and ability to learn.
Know about dental health and the benefits of good oral hygiene and dental flossing, including regular check ups at the dentist.
Know about personal hygiene and germs including bacteria, viruses, how they are spread and treated, and the importance of handwashing.
Know the facts and science relating to allergies, immunization and vaccination.

Science → SMSC Links

Spiritual

- Encourage pupils to reflect on the wonders of the natural world.

Moral

- Consider that not all developments have been good, and that they may have caused harm to the environment.
- Consider different perspectives and viewpoints and the reasons for these differences.
- Consider moral dilemmas in scientific developments.

Social

- Researching the work of different scientists, including female scientists.
- Opportunities to work in different pairings and groups.
- Explore the social dimension of scientific advances.
- Show respect for differing opinions i.e. creation.
- Co-operate in practical activities together.

Cultural

- Visits to different habitats and areas within the local environment.
- Raise awareness that scientific developments are the product of many different cultures.

Science → British Values

Democracy
- Take the views and opinions of others into account
- Take turns and instructions from others

The Rule of Law
- Understand the importance of safety rules when working scientifically
- Know that there are consequences in rules are not followed

Individual liberty
- Make choices when planning an investigation
- Others may have different points of view as to where to start

Tolerance
- Scientific discoveries have come from other cultures
- Religious beliefs often compete with scientific understanding

Mutual respect
- Work as a team
- Discuss findings
- Offer support and advice to others

EYFS – The Natural World (1)

Practitioners will;

- **Ensure that the e**arly years is about exploring and investigating the world, and about having fun and playing.
- Be aware that exploring and investigating are two key elements, which are crucial to establishing a lifelong love of learning.
- Be aware that Science also connects all other areas of learning, from language (describing what's happening in an experiment, learning new vocabulary) to maths and engineering (modelling, construction).
- Provide opportunities for the children to play and explore new concepts, sometimes independently and sometimes with a supporting adult.
- Carefully consider how adults in the setting question children - **'I see...'** is the beginning. **'I notice...'** adds more detail and encourages children to put their ideas into words and select appropriate vocabulary. **'I wonder...'** is the beginning of formulating questions and understanding different enquiry types. Children can then be supported to find out the answer.

EYFS – The Natural World (2)

Practitioners will;

- Acknowledge that children are naturally curious and keen to explore the world around them with awe and wonder. We can make the most of their desire to learn in a hands-on way by making sure our provision is accessible and engaging.
- Valuing child-led learning in all areas and encouraging children to plan and take ownership of what they want to discover next, sets them up for success.
- Science areas of provision will used in the classroom, for example, we might set up a mini science lab in provision where children can make predictions, test out their science ideas and explore independently. These work well both inside and outside and we will get children involved in designing and creating them with us.
- Activities will be changed or enhanced regularly. We will encourage children to see themselves as super scientists both now and in the future.

KS1 Science – Long Term Overview

	AUTUMN		SPRING	SUMMER
2023 - 2024	**Everyday Materials** **(Y1 unit)**		**Animals including Humans** **(Y1 Unit)** **Extraordinary Scientists - Who is Jane Goodall?**	**Plants – focus on the local area (inc trees)** **(Y1 unit)**
2024 - 2025	**Uses of Everyday Materials** **(Y2 unit)**	**Animals including Humans** **(Y2 unit)**	**Living Things and their Habitats** **(Y2 unit)** **Extraordinary Scientists - Who is Steve Backshall?**	**Plants - focus on plants from the** **(Y2 unit)**
	Seasonal Changes runs throughout the year and includes; • **Local area walks to observe and compare the world around us.** • **Observations of plants and trees in the local area at different times of year** **This is all recorded in a class big book.**			

Lower KS2 Science – Long Term Overview

	AUTUMN		SPRING		SUMMER
2023 - 2024	**Animals including Humans** **(Y3 unit)**	**Light** **(Y3 Unit)**	**Rocks** **(Y3 unit)**	**Forces and Magnets** **(Y3 unit)**	**Plants - Farming** **(Y3 unit)** **Extraordinary Scientists - Who was George Washington Carver?**
2024 - 2025	**Animals including Humans** **(Y4 unit)**	**Sound** **(Y4 unit)** **Extraordinary Scientists - Who was Alexander Graham Bell?**	**States of Matter** **(Y4 unit)**	**Electricity** **(Y4 unit)**	**Living Things and their Habitats** **(Y4 unit)** **Extraordinary Scientists - Who is David Attenborough?**

Upper KS2 Science – Long Term Overview

	AUTUMN		SPRING		SUMMER
2023 - 2024	**Animals including Humans** **(Y5 unit)**	**Light** **(Y6 unit)**	**Properties and Changes of Materials (Y5 unit)**	**Forces** **(Y5 unit)** **Extraordinary Scientists - Who was Isaac Newton?**	**Living Things and Their Habitats** **(Y5 unit)**
2024 - 2025	**Animals including Humans** **(Y6 unit)**	**Earth & Space** **(Y5 unit)** **Extraordinary Scientists - Who was Katherine Johnson?**	**Evolution & Inheritance** **(Y6 unit)** **Extraordinary Scientists - Who was Charles Darwin?**	**Electricity** **(Y6 unit)**	**Living Things and their Habitats** **(Y6 unit)**

Science Knowledge

Substantive Knowledge	Disciplinary Knowledge	Creativity in Science
In science, this is the knowledge produced by the academic subject. This involves concepts which form the underpinning structure of the subject, e.g. respiration, evolution and the idea of a force as well as the scientific vocabulary needed. The list of substantive knowledge for subjects is extensive and must be carefully sequenced over time.	In science, this is the knowledge needed to collect, understand and evaluate scientific evidence. It's the scientific method, i.e. changing one variable whilst keeping everything else the same – and seeing what happens. It is the ability to develop cognitive skills related to science such as acquiring scientific language, making observations, taking measurements, gathering, analysing and interpreting data, making generalisations, creating models, communicating and carrying out investigations. We use this knowledge every day. An example of this in everyday life is your TV remote. When it stops working, first you bang it, then you wipe the sensor, finally you change the battery. Each time you change one variable (the independent variable) before measuring its effect (the dependent variable) whilst keeping everything else the same (the control variables).	If children are to have the necessary skills and capabilities to face an ever-changing future, they need to become innovative and critical thinkers. Our approach to science fosters the children's natural curiosities whilst encouraging independent enquiry. Being creative in science includes: · thinking about things in different or unexpected ways · making connections between new ideas/experiences and old ones · finding new solutions to problems · testing out new ideas which enable the children to learn from their mistakes

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Materials	Bumpy Dry Floating Material Sinking Smooth Wet	Absorb Bend Change Cool Flexible Heat Liquid Magnetic Man-Made Material Melting Metal Natural Plastic Opaque Rigid Smooth Stretch Texture Twist Waterproof Wood	Absorbent Bicarbonate Conductivity Dissolve Evaporation Filtering Irreversible Opaque Reversible Separate Soda Solubility Strong Thermal Translucent Transparent Weak
Forces	Fast Force Speed Up Slow	Change Direction Direction Distant Further Pull Push Spin Squeeze Stretch Turn Twist	Air Resistance Attract Force Friction gears Gravity Levers Magnetic Magnetic Field Magnetic Pole Non-Magnetic Newtons Pulleys Repel Surface Resistance

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Electricity			Appliance Buzzer Cells circuit Conductor Dimmer Switch Fuse Generator Insulator Series Circuits Socket Switch Volts
Sound			Amplitude Auditory Decibel Frequency Insulation Medium Pitch Sound Wave Vibrating Volume
Light			Concave Convex Cornea Iris Lens Light source Light Wave Pupil Refraction Retina

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Rocks			Crystal Fossil Igneous Metamorphic Mineral Organic Matter Sedimentary Soil Quartz
States of Matter			Celsius Condensation Evaporation Freezing point Gas Irreversible Liquid Matter Melting Point Molecules Precipitation Reversible Solid Solution Temperature
Earth & Space			Astronomical Axis Crescent Moon Eclipse Gibbous Moon Lunar Orbit Planer Rotation Solar System Spherical

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Living Things & Their Habitats	Habitat Home Safe	Adapt Bird Desert Dinosaur Fish Indigenous Insects Mammals Microhabitats Ponds Rainforest Reptiles Rivers Seas Species Woodland	Algae Amphibian Bacteria Classification Consumer Embryo Fungi Gestation Invertebrate Micro-organism Monera Organism Protista Species Vertebrate
Plants	Branch Flower Fruit Leaves Petal Plant Roots Stem Tree Trunk vegetable	Blossom Bulb Earth Environment Habitat Oxygen Seeds Shoot Trunk Woodland	Anther Deciduous Evergreen Fertiliser Nutrients Pollination Seed Dispersal Stigma

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Living Things & Their Habitats	Habitat Home Safe	Adapt Bird Desert Dinosaur Fish Indigenous Insects Mammals Microhabitats Ponds Rainforest Reptiles Rivers Seas Species Woodland	Algae Amphibian Bacteria Classification Consumer Embryo Fungi Gestation Invertebrate Micro-organism Monera Organism Protista Species Vertebrate
Plants	Branch Flower Fruit Leaves Petal Plant Roots Stem Tree Trunk vegetable	Blossom Bulb Earth Environment Habitat Oxygen Seeds Shoot Trunk Woodland	Anther Deciduous Evergreen Fertiliser Nutrients Pollination Seed Dispersal Stigma

Science Vocabulary Progression

	EYFS	Key Stage One	Key Stage Two
Evolution & Inheritance			Adaption Chromosomes Evolution Excavating Genes Inheritance Off-Spring Paleontologists Predators
Seasonal Change		Autumn Spring Summer Temperature Thermometer Weather Weather symbol Winter	

Science Vocabulary Progression

Animals inc Humans

EYFS	Key Stage One	Key Stage Two
Choice	Adult	Atriums
Ear	Baby	Balanced Diet
Emotions	Carbohydrate	Blood Vessels
Eye	Carnivore	Bone
Food	Diet	Capillaries
Healthy	Difference	Canine
Hydrated	Exercise	Cartilage
Living	Healthy	Circulatory
Mouth	Herbivore	Dentil
Non-Living	Hygeine	Digestive
Nose	Nocturnal	Enamel
Unhealthy	Nutrition	Food Chain
	Minerals	Incisors
	Omnivore	Intestine
	Protein	Joint
	Senses	Molars
	Skeleton	Muscle
	Vitamin	Nutrition/Nutrients
	Young	Oesophegus
		Pancreas
		Pre-molars
		Predators
		Prey
		Pulse
		Oxygen
		Spine
		Tendon
		Ventricles

Content to be taught in each unit – Sticky Knowledge

Key Stage One

National Curriculum

The principal focus of science teaching in Key Stage One is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice.

They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.

They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Plants (Y1 unit)	**Pupils should be taught to;** • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees.	**Pupils might work scientifically by;** • Observing closely, using magnifying glasses, and comparing and contrasting familiar plants. • Describing how they were able to identify and group plants. • Drawing diagrams showing the parts of different plants, including trees. • Keep records of how plants changed over time.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Animals including Humans (Y1 unit)	**Pupils should be taught to;** • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Identify, draw and label the basic parts of the human body and say which part is associated with each sense.	**Pupils might work scientifically by;** • using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Everyday materials (Year 1 Unit)	**Pupils should be taught to;** • Distinguish between and object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties.	**Pupils might work scientifically by;** • Performing simple tests to explore questions, for example; 'What is the best material for an umbrella?' … for lining a dog basket? …. For curtains? …. For a book shelf?

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Seasonal Changes (Year 1 unit)	**Pupils should be taught to;** • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.	**Pupils might work scientifically by;** • Making tables and charts about the weather • Making displays of what happens in the world around them, including day length, as the seasons change.

Science – Key Stage One

Living Things and their Habitats (Year 2 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Explore and compare the differences between things that are living, dead and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro-habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	**Pupils might work scientifically by;** • Sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions, for example, Is a flame alive? Is a deciduous tree dead in winter? • Construct a simple food chain that includes humans (e.g. grass, cow, human) • Describe the conditions in different habitats and micro-habitats and find out how the conditions affect the number and types of plants and animals that live there.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Plants (Year 2 Unit)	**Pupils should be taught to;** • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	**Pupils might work scientifically by;** • Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb. • Observing similar plants at different stages of growth. • Setting up a comparative test to show that plants need light and water to stay healthy.

Science – Key Stage One

Animals, including Humans (Year 2 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	**Pupils might work scientifically by;** • Observing, through video or first hand observation and measurement, how different animals, including humans grow. • Asking questions about what things animals need for survival and what humans need to stay healthy. • Suggesting ways to find answers to their questions.

Science – Key Stage One

Uses of Everyday Materials (Year 2 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	**Pupils might work scientifically by;** • Comparing the uses of everyday materials found in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs). • Observing closely, identifying and classifying the uses of different materials, and recording their observations.

Lower Key Stage Two

National Curriculum

The principal focus of science teaching in Lower Key Stage Two is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make decisions about which types of scientific enquiry are likely to be the best way of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things that out using secondary sources of information. They should draw simple conclusions and use scientific language, first to talk about and later to write about what they have found out.

Science – Lower Key Stage 2

Plants (Year 3 Unit)

National Curriculum Statutory Requirements	Working Scientifically
Pupils should be taught to; • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk. Leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants. • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	**Pupils might work scientifically by;** • Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertilizer. • Discovering how seeds are formed by observing the different stages of plant life cycles over a period of time. • Looking for patterns in the structure of fruits that relate to how the seeds are dispersed. • Observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

Science – Key Stage One

Animals, including Humans (Year 3 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. • Identify humans and some other animals have skeletons and muscles for support, protection and movement.	**Pupils might work scientifically by;** • Identifying and grouping animals with and without skeletons and observing and comparing their movement. • Exploring ideas about what would happen if humans did not have skeletons. • Compare and contrast the diets of different animals (including pets) and decide on ways of grouping them according to what they eat. • Research different food groups and how they keep us healthy and design meals based on what they have found out.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Rocks (Year 3 Unit)	**Pupils should be taught to;** • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are made rocks and organic matter.	**Pupils might work scientifically by;** • Observing rocks, including those used in buildings and gravestones, and exploring how and why they have changed over time. • Using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether thy have fossils in them. • Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. • Explore different soils. And identify similarities and differences between them. • Investigate what happens when rocks are rubbed together or what changes occur when they are in the water. • Raise and answer questions about the way soils are formed.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Light (Year 3 Unit)	**Pupils should be taught to;** • Recognise that they need light in order to see things and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change.	**Pupils might work scientifically by;** • Looking for patterns in what happens to shadows when the light source moves or the distance between the ,light source and the object changes.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Force and Movement (Year 3 Unit)	**Pupils should be taught to;** • Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing.	**Pupils might work scientifically by;** • Comparing how different things move and grouping them. • Raising questions and carrying out tests to find out how far things move on different surfaces and gathering recording data to find answers to their questions. • Exploring the strengths of different magnets and finding a fair way to compare them. • Sorting materials into those are magnetic and those that are not. • Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another. • Identify how these properties make magnets useful in everyday items and suggest creative uses for different magnets.

Science – Key Stage One

Living Things and Their Habitats (Year 4 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things.	**Pupils might work scientifically by;** • Using and making simple guides or keys to explore and identify local plants and animals. • Making a guide to local living things. • Raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

Science – Key Stage One

Animals, including Humans (Year 4 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct an interpret a variety of food chains, identifying producers, predators and prey.	**Pupils might work scientifically by;** • Comparing the teeth of herbivores and carnivores, and suggesting reasons for differences. • Finding out what damages teeth and how to look after them. • Draw and discuss ideas about the digestive system and compare them with images and models.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
States of Matter (Year 4 Unit)	**Pupils should be taught to;** • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Pupils might work scientifically by;** • Grouping and classifying a variety of different materials, exploring the effect of temperature on substances such as chocolate, butter, cream (making food such as chocolate crispy cakes and ice-cream for a party). • Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line. • Investigate the effect of temperature on washing drying or snowmen melting.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Sound (Year 4 Unit)	**Pupils should be taught to;** • Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. • Find patterns between the pitch of a sound and features of the object that produced it. • Find patterns between the volume of a sound and the strength of the vibrations that produced it. • Recognise that sounds get fainter as the distance from the sound source increases.	**Pupils might work scientifically by;** • Finding patterns in the sounds that re made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. • Make earmuffs from different materials to investigate which provides the best insulation against sound. • Make and play own instruments by using what they have found out about pitch and volume.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Electricity (Year 4 Unit)	**Pupils should be taught to;** • Identify that common appliances run on electricity. • Construct a simple series electrical circuit, identifying and naming basic parts, including cells, wires, bulbs, switches and buzzers. • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors.	**Pupils might work scientifically by;** • Observing patterns, for example, that bulbs get brighter if more cells are added. • Investigate that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Upper Key Stage Two

National Curriculum

The principal focus of science teaching in Upper Key Stage Two is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about heir ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

At Upper Key Stage Two, pupils should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over a period 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 of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas and use their scientific knowledge and understanding to explain their findings.

Science – Key Stage One

Living Things and their Habitats (Year 5 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • Describe the life processes of reproduction in some plants and animals.	**Pupils might work scientifically by;** • Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, desert, in the oceans and in prehistoric times). • Asking pertinent questions and suggesting reasons for similarities and differences. • Grow new plants from different parts of the parent plant, for example, seeds, stem and root cutting, tubers, bulbs. • Observe changes in an animal over a period of time (for example by hatching and rearing chicks). • Comparing how different animals reproduce and grow.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Animals, including Humans (Year 5 Unit)	**Pupils should be taught to;** • Describe the changes as humans develop to old age.	**Pupils might work scientifically by;** • Researching the gestation periods of other animals and comparing them with humans by finding out and recording the length and mass of a baby as it grows.

Science – Key Stage One

Properties and Changes of Materials (Year 5 Unit)

National Curriculum Statutory Requirements

Pupils should be taught to;

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

Working Scientifically

Pupils might work scientifically by;

- Carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice-cream to stop it melting, or for making black out curtains?
- Compare materials in order to make a switch in a circuit.
- Observe and compare the changes that might take place, for example, when burning different materials or baking bread or cakes.
- Research and discuss how chemical changes have an impact on our lives for example cooing, and discuss the creative use of materials such as polymers, super-sticky and duper thin materials.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Earth and Space (Year 5 Unit)	**Pupils should be taught to;** • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day ad night and the apparent movement of the sun across the sky.	**Pupils might work scientifically by;** • Comparing the time of day at different places on the Earth through internet links and direct communication. • Create simple models of the solar system. • Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. • Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Forces (Year 5 Unit)	**Pupils should be taught to;** • Explain that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	**Pupils might work scientifically by;** • Exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. • Explore resistance in water by making and testing boats of different shapes. • Design and make products that use levers, pulleys, gears and/or springs and explore their effects.

Science – Key Stage One

Living Things and their Habitats (Year 6 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics.	**Pupils might work scientifically by;** • Using classification systems and keys to identify some animals and plants in the immediate environment. • Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Animals including Humans (Year 6 Unit)	**Pupils should be taught to;** • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • Describe the ways in which nutrients and water are transported with animals, including humans.	**Pupils might work scientifically by;** • Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Science – Key Stage One

Evolution and Inheritance (Year 6 Unit)	National Curriculum Statutory Requirements	Working Scientifically
	Pupils should be taught to; • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaption may lead to evolution.	**Pupils might work scientifically by;** • Observe and raise questions about local animals and how they are adapted to their environment. • Comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. • Analyse the advantages and disadvantages of specific adaptions, such as being on two feet rather then four, having a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Light (Year 6 Unit)	**Pupils should be taught to;** • Recognise that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	**Pupils might work scientifically by;** • Deciding where to place rear view mirrors on cars. • Designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. • Investigate the relationship between light sources, objects and shadows by using shadow puppets. • Look at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters – though they do not need to explain why these phenomena occur.

Science – Key Stage One

	National Curriculum Statutory Requirements	Working Scientifically
Electricity (Year 6 Unit)	**Pupils should be taught to;** • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.	**Pupils might work scientifically by;** • Identifying the effect of changing one component at a time in a circuit. • Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Agreed End Points – EYFS and KS1

We have plotted end points for each year group to ensure that children keep on track for the end of Key Stage end points. In this way we can get children ready for the next stage of their education

Our end points ensure that our curriculum is purposefully structured and logically sequenced, and new knowledge builds on previous knowledge – links can be made across different areas of study.

EYFS	ELGs in Purple
Understanding the World ***The Natural World**	• **Pupils will describe what they see, hear and feel whilst outside.** • **Pupils will plant seeds and care for the growing plants.** • **Pupils will draw pictures of plants and animals that they see.** • **Pupils will begin to understand the need to respect and care for the natural environment and all living things.** • **Pupils will understand the key features of the life cycle of an animal.** • **Pupils will use all their senses in hands-on explorations of natural materials.** • **Pupils will explore collections of materials with similar and /or different properties.** • **Pupils will explore the natural world around them, making observations and drawing pictures of animals and plants;** • **Pupils will 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;** • **Pupils will understand some important processes and changes in the natural world around them, including the seasons and changing states of matter**.

Units of Work – Knowledge

Key Stage One End Points

Year 1 WORKING SCIENTIFICALLY			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Ask simple questions when prompted	Pupil can understand that questions can be answered by testing.	Pupil can, with prompting, ask simple questions that can be tested, e.g. about plants growing in their habitat.	Pupil can ask simple questions that can be tested.
Suggest ways of answering a question	Pupil can, with prompting, offer way of gathering evidence to answer a question.	Pupil can offer ways of gathering evidence to answer a question, e.g. by deciding on the best material to use for a particular application.	Pupil can suggest different ways of answering question.
Make relevant observations	Pupil can examine objects, when prompted.	Pupil can examine objects to note key features, e.g. observe growth of plants they have planted.	Pupil can examine carefully, e.g. using a hand lens.
Conduct simple tests, with support.	Pupil can recognise a simple scientific test.	Pupil can, with support, conduct simple tests, e.g. comparing the properties of different materials.	Pupil can conduct simple tests.

Year 1 WORKING SCIENTIFICALLY			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
With prompting, suggest how findings could be recorded	Pupil can recognise the purpose of an experiment.	Pupil can, with prompting, identify what might usefully be recorded, e.g. drawing structures of plants or recording changing day length.	Pupil can, with assistance, draw and label diagrams.
Recognise findings	Pupil can, with prompting, identify key findings from an enquiry.	Pupil can identify key findings from an enquiry, e.g. noting how plants have changed over time.	Pupil can identify and group key outcomes from an enquiry.
Gather and record data	Pupil can collect data, when prompted.	Pupil can collect data, e.g. comparing and contrasting familiar plants.	Pupil can collect data relevant to the answering of questions.
Use observations to suggest answers to questions.	Pupil can. with prompting, suggest answers to enquiry questions using data.	Pupil can suggest answers to enquiry questions using data, e.g. describe how to group plants.	Pupil can answer enquiry questions using data and ideas.

Year 1 Plants and Animals, Including Humans			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Plants - identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Identify and name a limited range of plants.	Identify a range of local plants	Identify and notice similarities between various local plants.
Plants – Identify and describe the basic structure of a variety of common flowering plants and trees.	Identify and describe the basic structure of a common flowering plant.	Name parts of a range of familiar plants.	Identify and notice similarities in the structure of various local plants.
Animals, including humans – Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.	Identify and name a limited number of common animals.	Name a variety of common animals.	Identify common features of the main groups of vertebrates.
Animals, including humans - identify and name a variety of common animals that are carnivores, herbivores and omnivores	Begin to recognise the difference between carnivores, herbivores an omnivores.	Explain the differences between carnivores, herbivores and omnivores.	Suggest whether an unfamiliar animal can be a carnivore, herbivore or omnivore.
Animals, including humans - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	Identify the key features of one or two common animals.	Identify key features of a range of common animals.	Compare key features of familiar and unfamiliar animals.
Animals, including humans – identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Describe each of the human senses.	Relate each of the human senses to organs	Suggest how the senses are used in an activity such as eating.

Year 1 Materials			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Everyday Materials – Distinguish between an object and the material from which it is made.	Identify the material from which an object is made.	Correctly identify both object and material	Compare the same object made from different materials in terms of its effectiveness.
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock .	Identify and name a limited range of materials.	Identify and name a range of materials.	Identify typical uses of a range of materials.
Describe the simple physical properties of a variety of everyday materials	Recognise that a material has properties.	Describe a range of properties of a variety of materials.	Compare the physical properties of different everyday materials.
Compare and group together a variety of everyday materials on the basis of their simple physical properties	Compare and contrast two everyday materials.	Classify a variety of materials into groups based on physical properties.	Use simple physical properties to suggest classification of materials.

Year 1 Seasons			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Observe changes across the four seasons	Recognise that there are seasonal changes.	Describe seasonal changes.	Recognise changes within seasons as well as between seasons.
Observe and describe weather associated with the seasons and how day length varies	Recognise that day length alters in different seasons.	Relate weather patterns and day length to seasons.	Make and test predictions relating to changing day length and weather patterns.

Year 2 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Ask simple questions	Pupil can, with prompting, ask simple questions that can be tested.	Pupil can ask simple questions that can be tested, e.g. about the local environment and how organisms depend on each other.	Pupil can, with support, develop relevant, testable questions.
Recognise that questions can be answered in different ways	Pupil can offer way of gathering evidence to answer a question.	Pupil can suggest different ways of answering a question, e.g. testing the suitability of materials for different purposes.	Pupil can plan enquiry, such as a comparative or fair test.
Observe closely, using simple equipment	Pupil can examine objects closely, e.g. pebbles.	Pupil can examine carefully, e.g. using a hand lens.	Pupil can observe carefully and suggest useful measurements, e.g. examine a leaf and suggest measuring its length.
Perform simple tests	Pupil can, with support, conduct simple tests.	Pupil can conduct simple tests, e.g. setting up comparative tests to show that plants need water and light.	Pupil can conduct a series of simple tests.

Year 2 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Record and communicate their findings in a range of ways and begin to use simple scientific language	Pupil can, with prompting, identify what might usefully be recorded.	Pupil can, with assistance, draw and label diagrams, e.g. recording plants changing over time, starting from seed or bulb.	Pupil can, with prompting, draw and label diagrams.
Identify and Classify	Pupil can identify key findings from an enquiry.	Pupil can identify and group key outcomes from enquiry, e.g. describing conditions in different habitats and how these affect the numbers and types of organisms.	Pupil can, with prompting, suggest what an enquiry shows.
Gather and record data to help answer questions	Pupil can collect data.	Pupil can collect data relevant to the answering of questions, e.g. seeing how the shapes of some materials can be changed.	Pupil can recognise patterns that relate to scientific ideas, when prompted.
Use their observations and ideas to suggest answers to questions	Pupil can suggest answers to enquiry questions using data.	Pupil can answer enquiry questions using data and ideas, e.g. to help decide how the properties of certain materials make them suitable for certain applications.	Pupil can, with support, use evidence to produce simple conclusion.

Year 2
Living things and Their Habitats and Plants

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other	Identify that a habitat supplies living things with what they need.	Explain how, for a named animal or plant, it gets what it needs from its habitat and other living things that are there.	Explain why there may be a limit as to how many of a certain living thing can live in a particular area.
Identify and name a variety of plants and animals in their habitats, including micro habitats	Identify a limited range of living things in their habitats.	Identify a range of living things in habitats of various sizes.	Identify a range of living things and suggest why they may be found in that habitat.
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	Identify a predator-prey relationship.	Construct a simple food chain and identify what is eating what.	Suggest, within a simple food chain, what might happen if one of the living things becomes scarce.
Explore and compare the differences between things that are living, dead and things that have never been alive.	Identify things that are alive and thing that are not.	Identify things that have never been alive.	Sort out a variety of pictures into sets of things that are living, dead and things that have never ben alive.
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Find out one thing that plants need to grow and stay healthy.	Explore and identify what plants need to thrive.	Identify the effects of a shortage of each of the things that plants need to grow and stay healthy
Observe and describe how seeds and bulbs grow into mature plants	Identify that seeds and bulbs grow into mature plants.	Describe stages of development of a full grown plant.	Compare and contrast the growth patterns of different types of plants.

Year 2 Animals, including Humans			
National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Notice that animals, including humans, have offspring which grow into adults	Recognise that all animals, including humans, have offspring.	Describe the relationship between adult animals and their offspring.	Compare and contrast adults and their offspring for different animals.
Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)	Identify the basic needs of animals, including humans, for survival (water, food and air).	Identify human's basic needs.	Suggest how the basic needs of different animals influences their choice of habitat.
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Recognise the importance to humans of exercise, diet and hygiene.	Describe the importance of a healthy diet and exercise.	Suggest effects of poor diet and hygiene.

Year 2 Uses of Everyday Materials			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Identify that the shape of some objects can be changed.	Describe changes achieved by applying forces in different directions.	Identify that some changes to shapes are permanent and others are temporary, and that this can influence their uses.
Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.	Select and justify a material for a particular use.	For particular materials in particular uses, identify limitations as well as suitability.

Units of Work – Knowledge

Lower Key Stage Two End Points

Year 3 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Pupils can ask questions	Pupil can ask simple questions that can be tested.	Pupil can, with support, develop relevant, testable questions, e.g. what happens to shadows when the light source moves.	Pupil can develop relevant, testable questions.
Pupils can plan an enquiry	Pupil can suggest different ways of answering question.	Pupil can plan enquiry, such as comparative or fair test, e.g. comparing the effect of different factors on plant growth	Pupil can plan investigations using different types of scientific enquiry.
Pupils can identify and manage variables	Pupil can, with support, set up a comparative test.	Pupil can set up a comparative test, e.g. how far things move on different surfaces.	Pupil can set up comparative and fair tests.
Pupils can use equipment to take measurements	Pupil can use various equipment, with assistance, e.g. a thermometer.	Pupil can use various equipment, as instructed, e.g. using a hand lens to examine rocks.	Pupil can use various equipment, as instructed, repeatedly and with care.
Pupils explore how to improve the quality of data	Pupil can recognise some standard measurements, e.g. cm.	Pupil can use standard measurements when taking measurements, e.g. measuring distances between a light source and an object.	Pupil can recognise the importance of using standard units and measure accurately.

Year 3 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Pupils record work with diagrams and label them	Pupil can, with assistance, draw and label diagrams.	Pupil can, with prompting, draw and label diagrams, e.g. to show how water travels in a plant	Pupil can use words and diagrams to record findings.
Pupils can display data using labelled diagrams, keys, tables and bar charts	Pupil can recognise the function of a table.	Pupil can, with prompting, use tables to record evidence, e.g. recording what happens when various rocks are rubbed together.	Pupil can use various ways to record evidence.
Pupils can display data using line graphs	Pupil can recognise different ways of gathering and displaying evidence.	Pupil can, with prompting, gather and display evidence in various ways, e.g. about the ways that magnets behave in relation to each other	Pupil can use various ways to record, group and display evidence.
Pupils process findings to develop conclusions and identify causal relationships	Pupil can, with prompting, suggest what enquiry shows.	Pupil can, with prompting, write a conclusion based on evidence, e.g. exploring the strengths of different magnets.	Pupil can write a conclusion based on evidence.
Pupils use displays and presentations to report on findings	Pupil can, with support, indicate findings from an enquiry that could be reported.	Pupil can indicate findings from an enquiry that could be reported, e.g. answering questions about how rocks are formed.	Pupil can present findings either in writing or orally.

Year 4
Working Scientifically

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Take accurate measurements using standard units, where appropriate	Pupil can use standard measurements when taking measurements.	Pupil can recognise the importance of using standard units and measures accurately, e.g. measuring temperature when investigating its effect on washing drying	Pupil can take measurements that are precise as well as accurate.
Record findings using simple scientific language, drawings and labelled diagrams	Pupil can, with prompting, draw and label diagrams.	Pupil can use words and diagrams to record findings, e.g. how habitats change during the year.	Pupil can start to use labelled diagrams to show more complex outcomes.
Record findings using keys, bar charts, and tables	Pupil can, with prompting, use tables to record evidence.	Pupil can use various ways to record evidence, e.g. comparing the teeth of herbivores and carnivores.	Pupil can, with prompting, use various ways to record complex evidence.
Gather, record, classify and present data in a variety of ways to help to answer questions	Pupil can, with prompting, gather and display evidence in various ways.	Pupil can use various ways to record, group and display evidence, e.g. grouping and classifying various materials	Pupil can use line graph to record basic data.

Year 4
Working Scientifically

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Report on findings from enquiries, including oral and written explanations, of results and conclusions	Pupil can, with prompting, write a conclusion based on evidence.	Pupil can write a conclusion based on evidence, e.g. effect on brightness of bulbs if more cells are added.	Pupil can, with prompting, write a conclusion using evidence and identifying causal links.
Report on findings from enquiries using displays or presentations (^)	Pupil can indicate findings from an enquiry that could be reported.	Pupil can present findings either in writing or orally, e.g. relating to investigating which materials are conductors	Pupil can, with support, display and present key findings from enquiries orally and in writing.
Identify differences, similarities or changes related to simple scientific ideas and processes	Pupil can, with prompting, recognise patterns that relate to scientific ideas.	Pupil can recognise patterns that relate to scientific ideas, e.g. finding out which materials make better earmuffs.	Pupil can arrange data to make clear key characteristics.
Use straightforward scientific evidence to answer questions or to support their findings	Pupil can, with support, use evidence to produce a simple conclusion.	Pupil can use evidence to produce a simple conclusion, e.g. the effect of temperature on various substances	Pupil can show how evidence supports a conclusion.
Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	Pupil can suggest how an investigation could be extended.	Pupil can use evidence to suggest further relevant investigations, e.g. making own instruments, using ideas about pitch and volume.	Pupil can suggest further relevant comparative or fair tests.

Lower Key Stage Two (Year 3) → Plants			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
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.	Suggest how one of the requirements for plants to stay healthy could be explored.	Explain what all plants need to flourish and recognise how these requirements vary in amount.	Compare the requirements of different plants and link these to particular habitats.
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	Identify different parts of a flowering plant: roots, stem/trunk, leaves and flowers.	Describe what each part of a flowering plant does.	Suggest why parts may vary in size and shape from one species of flowering plant to another.
Investigate the way in which water is transported within plants	Identify that water is transported within plants.	Explain, with the aid of a diagram or plant, how water is carried up from the soil.	Suggest how this process might vary from one type of plant to another.
Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Describe the processes of pollination, seed formation and seed dispersal.	Explain how pollination, seed formation and seed dispersal play a role in the reproduction of flowering plants.	Suggest why pollination, seed formation and seed dispersal may vary from one type of plant to another.

Lower Key Stage Two (Year 3) → Animals, including Humans			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.	Identify that animals, including humans, need the correct nutrition.	Describe why animals depend on the correct nutrition.	Explain why a varied diet is important.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Recognise that humans and some other animals have skeletons and muscles.	Explain which parts of the skeleton provide support and protection, and how they allow for movement.	Compare the ways that the skeletons of different animals provide support, protection and movement.

Lower Key Stage Two (Year 3) → Rocks			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Describe in simple terms how fossils are formed when things that have lived are trapped within a rock.	Understand that fossils indicate the shape of previous life forms.	Explain how fossils are formed.	Explain the importance of studying fossils.
Recognise that soils are made from rocks and organic matter	Describe the appearance of soil, recognising that it is a mixture of materials.	Describe how soil is made.	Compare different soils in terms of composition.
Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.	Identify that rocks vary in terms of appearance and physical properties.	Examine and test rocks, grouping them according to the results.	Suggest uses for different kinds of rocks based on their properties.

Lower Key Stage Two (Year 3) → Light			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Recognise that they need light in order to see things and that dark is the absence of light	Identify that light is necessary for vision.	Relate being able to see to the presence of light.	Recognise that vision involves light travelling to the eyes.
Notice that light is reflected from surfaces	Identify that mirrors reflect light.	Describe how some objects reflect light.	Recognise that some surfaces are better at reflecting light than others.
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes	Recognise that light from the sun can be dangerous.	Describe how and why our eyes should be protected from sunlight.	Explain why sunlight can be dangerous and how types of protection works.
Recognise that shadows are formed when the light from a light source is blocked by a solid objects	Recognise that light cannot pass through some objects.	Explain how shadows are made.	Suggest how light is travelling to form a shadow.
Find patterns in the way that the size of shadows change	Identify that the size of shadows can be changed.	Describe how to change the size of a shadow.	Relate position of an object and position of a screen to the size of the shadow.

Lower Key Stage Two (Year 3) → Forces and Magnets			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Compare how things move on different surfaces	Recognise that things may move differently on different surfaces.	Compare how an object, such as a toy car, will move on different surfaces.	Predict how an object will move on other surfaces and suggest why.
Notice that some forces need contact between two objects, but magnetic forces can act at a distance	Recognise that magnetic forces don't require physical contact.	Recognise the difference between contact and contact forces.	Explore how magnetic attraction and repulsion are affected by distance.
Observe how magnets attract or repel each other and attract some materials and not others	Identify that magnets affect each other.	Describe how magnets attract or repel each other, and attract magnetic materials.	Explore whether some magnets are stronger than 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	Recognise that some materials are magnetic and that others are not.	Group materials on the basis of testing for being magnetic.	Group materials on the basis of testing for being magnetic.
Describe magnets as having two poles	Recognise the term 'magnetic pole'.	Describe and identify the poles of a magnet.	Explore the similarities and differences between the two poles.
Predict whether two magnets will attract or repel each other, depending on which poles are facing	Recognise that magnets affect each other differently, depending on which poles are facing.	Predict outcomes of a particular arrangement of magnets.	Apply ideas about the interaction of magnets to contexts such as toys.

Lower Key Stage Two (Year 4) → Living Things and Habitats			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Recognise that living things can be grouped in a variety of ways.	Suggest a way of grouping living things, e.g. sort shells by colour.	Suggest different ways of sorting the same group of living things, e.g. grouping birds according to where they live, what they eat and size of adults.	Suggest why some ways of grouping living things may be more useful than others, e.g. why grouping by number of legs is an easy aid to identification.
Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	Use classification keys to group and identify members from a small group of living things.	Use classification keys to group and identify members from a range of familiar and less familiar living things.	Use classification keys to group and identify members from a range of familiar and less familiar living things.
Recognise that environments can change and that this can sometimes pose dangers to living things.	Describe how environments might change.	Describe examples of living things that are threatened by changes to environments, e.g. owls and habitat loss.	Describe examples of living things adapting to environmental change, e.g. urban foxes, and examples of extinction due to environmental change.

Lower Key Stage Two (Year 4) → Animals, including Humans			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Describe the simple functions of the basic parts of the digestive system in humans.	Describe the purpose of the digestive system in humans.	Identify what each of the principal organs in the digestive system do.	Explain why the simple functions of the basic parts of the digestive system in humans are necessary.
Identify the different types of teeth in humans and their simple functions	Recognise that humans have different types of teeth.	Describe the function of each type of tooth in the human skull.	Explain why humans have different types of teeth.
Construct and interpret a variety of food chains, identifying producers, predators and prey	Understand the roles of producers, predators and prey.	Use a food chain to represent predator-prey relationships.	Suggest what might happen in a food chain if the population of one of the organisms changes

Lower Key Stage Two (Year 4) → States of Matter			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Compare and group materials together, according to whether they are solids, liquids or gases	Recognise the state of matter of different materials.	Group materials according to their state of matter.	Recognise that some materials (e.g. toothpaste) cannot be easily classified as solid. liquid or gas.
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Relate the terms 'evaporation' and 'condensation' to water.	Describe how evaporation and condensation happen in the water cycle, and how temperature affects evaporation.	Apply the relationship between rate of evaporation with temperature to everyday contexts.
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)	Recognise that materials may change state.	Identify changes of state and research values of degrees Celsius at which changes happen.	Suggest patterns in which kinds of materials change state at higher or lower temperatures.

Lower Key Stage Two (Year 4) → Sound			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Identify how sounds are made, associating some of them with something vibrating.	Identify how an object may vibrate.	Explain, with reference to vibrations, how an object makes a sound.	Group sound-making objects in terms of how they make sounds.
Recognise that vibrations from sounds travel through a medium to the ear	Recognise that the ear detects vibrations.	Describe the role of a medium in the transmission of sound.	Compare the effectiveness of different media in terms of their ability to transmit sound
Recognise that sounds get fainter as the distance from the sound source increases	Suggest why some sounds are louder than others.	Describe the effect of moving further from the source of a sound.	Explain with reference to examples how sounds get fainter as the distance from the source increases.
Find patterns between the pitch of a sound and features of the object that produced it	Recognise that the pitch of a sound can be varied.	Explain with reference to a particular object how the pitch of the sound can be changed.	Identify generic features that cause the pitch of a note to be changed.
Find patterns between the volume of a sound and the strength of the vibrations that produced it.	Recognise that the volume of a sound can be varied.	Explain with reference to a particular object how the volume of the sound can be changed.	Identify generic features that cause the volume of a note to be changed.

Lower Key Stage Two (Year 4) → Electricity			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Identify common appliances that run on electricity	Recognise that some appliances run on electricity.	List examples of appliances that run on electricity.	Compare and contrast appliances that run on mains electricity with those that run on batteries.
Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Construct a simple circuit.	Construct a simple circuit and name its components.	Identify the functions of components within a circuit.
Recognise some common conductors and insulators, and associate metals with being good conductors	Identify metal as a conductor.	Sort materials into conductors and insulators, identifying metals as conductors.	Investigate graphite as a conductor and relate to other materials.
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	Understand that a complete circuit is needed for a circuit to operate.	Predict whether a particular arrangement of components will result in a bulb lighting.	Explain why certain arrangements will not result in the bulb lighting.
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 the function of a switch.	Predict how the operation of a switch will affect bulbs lighting.	Explain how altering the location of a switch affects the operation of the circuit.

Units of Work – Knowledge

Upper Key Stage Two End Points

Year 5
Working Scientifically

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
With prompting, plan different types of scientific enquiries to answer questions	Pupil can plan investigations using different types of scientific enquiry.	Pupil can, with support, can answer questions using evidence gathered from different types of scientific enquiry, e.g. comparing life cycles of different plants using change over time, surveys and secondary research.	Pupil can answer questions using evidence gathered from different types of scientific enquiry.
With prompting, recognise and control variables where necessary	Pupil can set up comparative and fair tests.	Pupil can, with prompting, identifies and manages variables, e.g. when exploring falling paper cones.	Pupil can identify and manage variables.
Select, with prompting, and use appropriate equipment to take readings	Pupil can, following discussion, follow guidance to use equipment, e.g. timer.	Pupil can, following discussion of alternatives, selects appropriate equipment, e.g. using a shadow stick and measuring length and angle of shadow	Pupil can use appropriate equipment, such as meter rule, to take measurements, such as distance travelled.
Take precise measurements using standard units	Pupil can recognises importance of using standard units and measures accurately.	Pupil can take measurements that are precise as well as accurate, e.g. measuring the force needed to pull different shapes of boat through the water	Pupil can consider how by modifying instrument or technique , measurements can be improved.

Year 5 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Take and process repeat readings	Pupil can, with prompting, can take repeat readings.	Pupil can know how to process repeat readings, e.g. when timing falling objects.	Pupil can identify situations in which taking repeat readings will improve the quality of evidence.
Record data and results	Pupil can use words and diagrams to record findings.	Pupil can start to use labelled diagrams to show more complex outcomes, e.g. comparing the time of day at different places on the earth.	Pupil can use labelled diagrams to show complex outcomes.
Record data using labelled diagrams, keys, tables and charts	Pupil can use various ways to record evidence.	Pupil can, with prompting, use various ways to record complex evidence, e.g. when investigating how gears and levers enable a small force to have a larger effect.	Pupil can use various ways, as appropriate, to record complex evidence.
Use line graphs to record data	Pupil can, with prompting, use line graphs.	Pupil can use a line graph to record basic data, e.g. length and mass of a baby as it grows.	Pupil can use line graphs to display complex data.

Year 5 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships	Pupil can write a conclusion based on evidence.	Pupil can, with prompting, write a conclusion using evidence and identifying causal links, e.g. investigating what makes a parachute fall quicker.	Pupil can write a conclusion using evidence and identifying causal links.
With support, present findings from enquiries orally and in writing	Pupil can present findings either in writing or orally.	Pupil can, with support, display and present key findings from enquiries orally and in writing, e.g. suggesting reasons for similarities and differences between various animals	Pupil can display and present key findings from enquiries orally and in writing.
With prompting, identify that not all results may be trustworthy	Pupil can indicate individual results that might be suspect.	Pupil can, with support, indicate why some results may not be entirely trustworthy, e.g. when timing falling objects.	Pupil can, in conclusions, indicate how trustworthy they are.
Suggest how evidence can support conclusions	Pupil can, with prompting, show how evidence supports a conclusion.	Pupil can show how evidence supports a conclusion, e.g. researching gestation periods of various mammals and relating them to adult mass	Pupil can identify how an idea is supported or refuted by evidence.

Year 5 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Suggest further comparative or fair tests	Suggest further comparative or fair tests	Pupil can suggest further relevant comparative or fair tests, e.g. when testing materials for various properties to determine their suitability for an application.	Pupil can use evidence to suggest further comparative or fair tests that would develop the investigation.

Year 6
Working Scientifically

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Plan different types of scientific enquiries to answer questions	Pupil can, with support, can answer questions using evidence gathered from different types of scientific enquiry.	Pupil can answer questions using evidence gathered from different types of scientific enquiry, e.g. operation of circulatory system from experiment, survey and secondary research.	Pupil can suggest which type of enquiry is likely to be more successful at providing answers to a particular question.
Recognise and control variables where necessary	Pupil can, with prompting, identifies and manages variables.	Pupil can identify and manage variables, e.g. distances and sizes in shadow formation.	Pupil can identify and manage variables and recognises variables that cannot be easily managed.
Take measurements using a range of scientific equipment	Pupil can, following discussion of alternatives, select appropriate equipment, e.g. measuring jug to measure volume.	Pupil can use appropriate equipment, such as meter rule, to take measurements, such as distance travelled by light.	Pupil can recognise limitations of available equipment, e.g. accuracy of balance.
Take measurements with increasing accuracy and precision	Pupil can take measurements that are precise as well as accurate.	Pupil can consider how by modifying instrument or technique, measurements can be improved, e.g. when recording route of light rays.	Pupil can explain why repeatedly taking repeat readings is of little value.

Year 6 Working Scientifically			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Report and presents findings from enquiries in oral and written forms such as displays and other presentation	Pupil can, with support, display and present key findings from enquiries orally and in writing.	Pupil can display and present key findings from enquiries orally and in writing, e.g. deciding how well classifications fit unfamiliar animals and plants.	Pupil can evaluate the best way of displaying and presenting key findings.
Report and present findings from enquiries, including explanations of, and degree of, trust in results	Pupil can, with support, indicate why some results may not be entirely trustworthy.	Pupil can, in conclusions, indicate how trustworthy they are, e.g. in relating brightness of bulb to voltage supplied.	Pupil can, in conclusions, indicate, if appropriate, why the results may not be entirely trustworthy.
Identify scientific evidence that has been used to support or refute ideas or arguments	Pupil can show how evidence supports a conclusion.	Pupil can identify how an idea is supported or refuted by evidence, e.g. selective breeding to produce animals or plants with desirable characteristics.	Pupil can suggest how factors other than evidence may support or oppose an idea.
Use test results to make predictions to set up further comparative and fair tests	Pupil can suggest further relevant comparative or fair tests.	Pupil can use evidence to suggest further comparative or fair tests that would develop the investigation, e.g. in the design of rear view mirrors for cars.	Pupil can evaluate which further comparative or fair tests would be particularly useful.

Year 6
Working Scientifically

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
Take repeat readings when appropriate	Pupil can know how to process repeat readings.	Pupil can identify situations in which taking repeat readings will improve the quality of evidence, e.g. investigating the behaviour of components in a circuit.	Pupil can explain why repeatedly taking repeat readings is of little value.
Record data and results of increasing complexity using scientific diagrams and labels	Pupil can start to use labelled diagrams to show more complex outcomes.	Pupil can use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors.	Pupil can explain why a labelled diagram may be particularly effective.
Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar charts	Pupil can, with prompting, uses various ways to record complex evidence.	Pupil can use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to aid plant identification.	Pupil can evaluate various ways of recording complex data.
Record data and results of increasing complexity using line graphs	Pupil can use a line graph to record basic data.	Pupil can use line graphs to display complex data, e.g. size of object in relation to the size of the shadow it casts.	Pupil can explain the advantages of using line graphs.
Report and present findings from enquiries, including conclusions and causal relationships	Pupil can, with prompting, write a conclusion using evidence and identifying causal links.	Pupil can write a conclusion using evidence and identifying causal links, e.g. in the design of a periscope.	Pupil can suggest possible limits to causal relationships.

Upper Key Stage Two (Year 5) → Living Things and Habitats			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	Explain what a life cycle is, e.g. that kittens grow into cats, have kittens and die.	Identify similarities and differences in two different life cycles, e.g. sparrow and butterfly, with reference to eggs and intermediate stages	Suggest similarities in the life cycles of a number of vertebrates, e.g. comparison of dog, human and bird embryos.
Describe the life process of reproduction in some plants and animals.	Describe the life process of reproduction in humans.	Describe in sequence the stages of reproduction in some plants and animals, e.g. dog and a thistle.	Compare the process of reproduction in animals and plants, e.g. compare and contrast fertilisation.

Upper Key Stage Two (Year 5) → Properties and Changes of Materials

National Curriculum Objectives	Working towards Expectations	Meeting Expectations	Exceeding Expectations
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.	Compare and group together everyday materials on the basis of their appearance and feel.	Test and sort a range of materials based on their physical properties.	Suggest why those properties might influence the selection of those materials for certain uses.
Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	Know that some materials will dissolve in liquid to form a solution.	Describe how some materials, e.g. sugar, will dissolve and can be retrieved.	Identify that some soluble materials are more soluble than others.
Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	Suggest how mixtures might be separated.	Justify separation techniques proposed, with reference to materials being separated.	Explain why a particular separation method might be more effective.
Demonstrate that dissolving, mixing and changes of state are reversible changes.	Understand that some processes are reversible.	Show how the original materials can be retrieved from each of these changes.	Classify various processes relating to materials as reversible or irreversible.
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	Understand that burning is irreversible.	Identify reactants and products of chemical changes and recognise these as being irreversible.	Provide examples of when changes being irreversible are a good thing, e.g. making bricks, or not, e.g. non-biodegradable plastic bags.
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	Give reasons for the particular uses of everyday materials, including metals, wood and plastic.	Use evidence to justify the selection of a material for a purpose.	Suggest limitations of the uses of selected materials based on test results.

Upper Key Stage Two (Year 5) → Animals, including Humans			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Describe the changes as humans develop to old age.	Identify that people change as they age, e.g. recognise differences in appearance, abilities etc.	Describe the changes as humans develop to old age, e.g. trends in changes to size, weight, mobility etc.	Suggest why some of the changes that take place in humans happen, e.g. suggest why babies have disproportionately large heads compared to adults.

Upper Key Stage Two (Year 5) → Earth and Space			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	Recognise that the planets move, relative to the Sun.	Draw a diagram or use a model to describe planetary orbits.	Identify that the further out a planet is, the longer its orbit is around the Sun.
Describe the movement of the Moon relative to the Earth	Recognise that the Moon moves relative to the Earth.	Draw a diagram or use a model to describe the Moon's orbit around the Earth.	Relate the Moon's orbit of the Earth to the Earth's orbit of the Sun.
Describe the Sun, Earth and Moon as approximately spherical bodies	Sketch the outlines of the Sun, Earth and Moon.	Describe the Sun, Earth & Moon as spheres.	Recognise that many heavenly bodies are approximately spherical.
Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Relate day and night to the apparent position of the Sun.	Use a diagram or model to explain why the Sun seems to travel across the sky, and what causes day and night.	Explain the effect of a planet in the solar system rotating at a different rate to Earth.

Upper Key Stage Two (Year 5) → Forces			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.	Describe the effect of gravity on unsupported objects.	Explain that gravity causes objects to fall towards Earth.	Recognise that gravity acts between all masses, e.g. the Sun and the Earth.
Identify the effects of air resistance, water resistance and friction, that act between moving surfaces	Recognise that motion may be resisted by forces.	Describe how motion may be resisted by air resistance, water resistance or friction.	Identify ways in which forces that oppose motion may be useful (e.g. bicycle handlebar grips) or a nuisance (e.g. bicycle chain).
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Recognise that simple machines transfer force.	Describe how some devices may turn a smaller force into a larger one.	Explain, with reference to everyday contexts, why a force multiplier might be useful.

Upper Key Stage Two (Year 6) → Living Things and Habitats			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
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	Identify the broad groups into which living things are classified, e.g. mammals.	Use similarities and differences in observable features to decide how living things should be grouped, e.g. a cat is a mammal because it is warm blooded and gives birth to live young.	Explore why some living things, such as the duck billed platypus, don't neatly fit into one group.
Give reasons for classifying plants and animals based on specific characteristics	State how plants and animals can be classified using specific characteristics.	Explain why certain features are useful in classifying living things, e.g. backbones in animals and flowers in plants.	Explain why other features are less useful as a basis for classification, such as size or colour.

Upper Key Stage Two (Year 6) → Animals, including Humans			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	Name the main parts of the human circulatory system, e.g. heart, arteries, veins.	Describe what heart, blood vessels and blood do, e.g. carry oxygen to all parts of the body.	Explain some characteristics of the heart, blood vessels and blood, e.g. explain that the arteries are thicker because they carry blood at a higher pressure
Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Recognise that diet, exercise, drugs and lifestyle impact on the way the body functions, e.g. knowing that exercise changes the body.	Suggest how their bodies are affected by substances and actions, e.g. that a high fat diet coupled with little exercise is likely to lead to obesity.	Explain how decisions about lifestyle can affect the quality of life, e.g. recognise that making excessive use of convenience foods may introduce more additives into the diet.
Describe the ways in which nutrients and water are transported within animals, including humans	Describe that nutrients and water are transported within humans.	Describe with aid of diagrams the route that water takes within animals, e.g. through the human body.	Compare the ways in which nutrients and water are transported in two animals that are quite different.

Upper Key Stage Two (Year 6) → Evolution and Inheritance			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	Recognise that fossils provide information about living things from millions of years ago, e.g. understand that they are preserved remains of extinct living things	Use fossils as evidence that living things have changed over time, e.g. explain that these have died out and others have taken their place.	Suggest possible reasons for changes to living things over time, e.g. why penguins can't fly but are good at swimming.
Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	Recognise that living things produce offspring of the same kind, but normally offspring vary, e.g. that puppies have common features but are not identical.	Recognise that offspring normally vary from each other and from their parents, e.g. that puppies vary from each other and from their parents.	Recognise that selective breeding may result in offspring with certain features, e.g. pedigree dogs with a certain shape or colour.
Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution .	Identify ways in which certain animals and plants are adapted to suit their environment in different ways.	Describe examples of a living thing that has adapted to live in a particular habitat and evolved as a result, e.g. a polar bear or cactus.	Give examples of living things that have evolved in different ways, e.g. different types of finch.

Upper Key Stage Two (Year 6) → Light			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Recognise that even when light changes in direction, the path is still continuous.	Recognise that light travels from one point to another.	Represent light using straight line ray diagrams.	Recognise that even when light changes in direction, the path is still continuous.
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.	Recognise that some objects reflect light.	Draw diagrams using straight lines showing light travelling to the eye.	Draw diagrams using straight lines showing light reflecting off objects and into the eye.
Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.	Describe how light travels from light sources to our eyes.	Explain how we can see an object by referring to light travelling into the eye.	Refer to the idea that some objects may be better reflectors than others.
Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Relate the shape of shadows to the shape of the object that makes them.	Draw a diagram showing an object, shadow and light to relate object shape to shadow shape.	Use a diagram to explain that although a shadow is the same shape as the object, it may not be the same size.

Upper Key Stage Two (Year 6) → Electricity			
National Curriculum Objectives	**Working towards Expectations**	**Meeting Expectations**	**Exceeding Expectations**
Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit	Recognise that changing the number and voltage of cells may alter the operation of a circuit.	Explain how number and voltage of cells affects the lamp or buzzer.	Relate the number or voltage of cells to the number and operation of bulbs or buzzers that can be run from them.
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	Identify the function and operation of different components.	Explain the use of switches, how bulbs can be made brighter and buzzers made louder.	Explain the effect of changing the order of the components in a circuit.
Use recognised symbols when representing a simple circuit in a diagram	Understand that components can be represented by symbols.	Represent a circuit that has been constructed using symbols.	Design circuits using symbols.