Science

at

Firs Primary School

Changes: November 2023

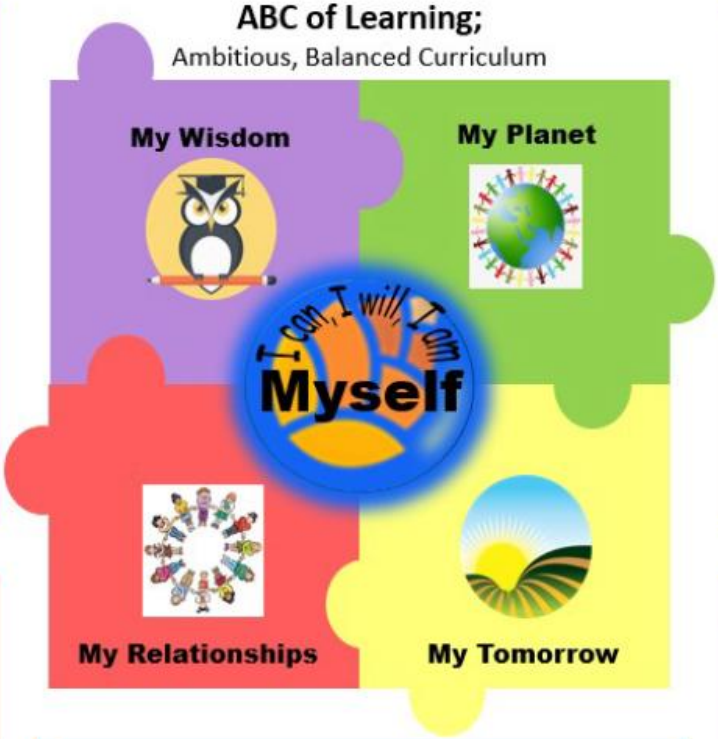
Reviewed: September 2025

Contents

Firs Primary School Curriculum Intent

- Applying our knowledge to solve problems in new contexts.
- Recognising bias or fairness in what we read, hear and see and knowing when to trust information.
- Debating respectfully when we disagree with others, using evidence to support our ideas.

ABC of Learning;
Ambitious, Balanced Curriculum



- Caring for our environment in school, locally and in the wider world.
- Understanding current affairs and global events and our part in these.
- Seeing ourselves as part of a global community.

- Showing empathy, care, concern and tolerance towards all others.
- Understanding how to have healthy and happy relationships.
- Working with others to achieve a common goal.

- Keeping myself safe and healthy, looking after my mind and body.
- Being happy with who I am, recognising my achievements and what makes me special.
- Taking responsibility for my actions and for my future.

- Aspiring to meet our full potential, understanding our strengths and meeting challenges with confidence and resilience.
- Developing the skills we need to be successful and independent adults.

Firs Curriculum Design and Intent

Our curriculum at Firs primary school, runs within a 2-year cycle, due to mixed year groups within the juniors. The core objectives will be taught based on the National Curriculum's statutory objectives. Some objectives may be revisited and extended to support the year group.

At Firs Primary school, our lessons are tailored and designed to:

- ✓ Allow children to undertake scientific enquiries to help them answer scientific questions about the world around them to ensure inclusive practice
- ✓ Equip children with the scientific knowledge to understand the uses and implications of science, developing children's understanding of famous scientific discoveries and how they impact our research today
- ✓ Teach the children to use a range of methods to communicate their scientific information and present it systematically and scientifically including diagrams, graphs, tables and charts
- ✓ Develop the children's enthusiasm and enjoyment of scientific learning and discovery
- ✓ Ensure the lessons are accessible to all learners, acknowledging our high transience within the school – developing children's understanding from a range of starting points
- ✓ We endeavour to ensure that the Science curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.
- ✓ Ensure vocabulary is taught explicitly, using 'word aware', visual examples/images and 'Communication In Print' to support children reinforce and learn new vocabulary, while putting the words into context for subject-specific vocabulary
- ✓ Develop children's oracy while communicating their scientific skills
- ✓ Provide additional opportunities where possible to enhance and contextualise learning (including activities from British Science week, competitions and STEM activities)

Curriculum Design – Implementation

EYFS

The new EYFS Curriculum progression grids 2021, have been linked clearly to the KS1 National Curriculum to map progression. This shows what knowledge from "Understanding of the World: The Natural World" for a "Good Level of Development" (GLD) child should have when they enter KS1.

EYFS children will have the opportunity to explore the natural world through their continuous provision, making links to the real world and the understanding how things work around them. They will have tailored, short burst input sessions to focus on a current learning topic, including ones that will have a Science driven focus.

Science

EYFS Curriculum – Early Learning Goals	National Curriculum Objectives Year 1
Understanding the World: The Natural World • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	**Working Scientifically** During year 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content. • Asking simple questions and recognising that they can be answered in different ways. • Observing closely, using simple equipment. • Performing simple tests. • Identifying and classifying. • Using their observations and ideas to suggest answers to questions. • Gathering and recording data to help in answering questions. **Plants** • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees. **Animals, Including Humans** • Identify and name a variety of common animals, including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of common animals (fish, amphibians, reptiles, birds and mammals, including pets.)

Key stages 1 and 2

As we follow the National Curriculum, we know that there is progress and coverage across the school. This can be seen in more detail in the whole school overview (*science Progression and Coverage document)* and the *topic booklets* for each half term.

Timetable and Rationale

Science, where possible is linked to the topic of that half term. Through mapping the national curriculum, science isn't taught every half term. Science is taught progressively through the topics and half term, not through "science weeks" although this may be used as an opportunity to extend their learning further, past the national curriculum or complete more complex projects.

Timetabling is flexible throughout the school and therefore science may not always be taught in the same slot. This ensures that interventions or other opportunities such as family learning, and boxing for well-being, do not replace the learning of science for some pupils. Science may also be taught in the morning or the afternoon and this is carefully planned for and decided by the teacher.

Structure of lessons at Firs

Pre-unit Quiz

The pre-unit quiz will be implemented at the start of each unit to assess prior learning brought forwards from previous years that feeds into the current area of learning.

Examples can be found below of the Pre-unit quiz.

Date	
Subject/s	Science
Pre-unit Quiz	
Area	Earth and Space
Subject knowledge (Prior learning: Year 1 Seasons)	
Name the different seasons?	
What happens during each season?	
Why do different seasons happen?	
Working scientifically (prior learning Upper key stage 2 in Autumn 1 and Lower key stage 2)	
Recording data You want to find out the temperature fluctuation (change in temperature) over three days in Summer and 3 days in Autumn. What **resources** could you use and **how** would you records this?	
Observation Look at this image of a leaf in summer then over time into Autumn, write your **observations about the leaf.**  period of time brown green orange dry crumble fragile shrink shrivel moisture	

Vocabulary

Vocabulary will be taught throughout the lesson. Teachers will plan accordingly to ensure the correct subject-specific vocabulary is being implemented throughout the lesson. This will be evident within the teacher's input and continually displayed within

the classroom to support the children use the correct vocabulary within the lesson. Teachers may have vocabulary on the working walls and also use 'Word Aware' strategy to enable children to contextualise and write the word phonetically. Subject-specific vocabulary will also be found at the top of the success criteria within their books or whole class topic book.

Scientific investigations

Scientific investigations will happen at least once within each unit of Science. Where Science is taught in that half term, there would be a minimum of one piece of work that has a practical element to ensure inclusive practice. Teachers have no set time limit as to how long a scientific investigation will last. It is recommended they are over two lessons to ensure thorough coverage and write up.

Working Scientifically

Children are encouraged to work scientifically within all of their science lessons throughout. This may be completed discreetly. Children will be encouraged to:

- Ask scientific questions
- Conduct research
- Predict and hypothesise
- Plan an enquiry
- Observe
- Measure and record data
- Interpret results
- Conclude their results

These can be found within the *Working scientifically symbols document.* These skills are taught frequently throughout the sequence of lessons. There is no requirement to teach these every lesson, but throughout each unit, children should have had an opportunity to use these skills within each unit, some focused on more than others.

The symbols are being integrated within phase groups [starting with year 5/6 in Spring 2022]. The symbols link to working scientifically objectives from the National curriculum. They are to be used within lessons at various opportunities to reinforce the children's learning and support the children recognise these objectives visually. These will be used within the steps to success/vocabulary section, during the lesson next to different headings, used within the class on the working walls where appropriate. When they are fully implemented, the children will be able to use these symbols to recognise the scientific skills and understand what they need to do to achieve the objective. The symbols are grouped according to the skills and used in particular when writing up investigations, to fit in with the written sections.

Assessment at the end of a lesson/unit

Children will have the opportunity to self-assess their success criteria against each step to success. Teachers will mark the work and give feedback accordingly before the next Science lesson, they will assess the objective in green or orange to show the level of their understanding against each step to success and provide written feedback where necessary.

At the end of each unit, the class teacher will record the names of the children working below, working towards, working at age-related and those working above the expected standard. These will be recorded in the topic booklet.

Meeting the needs of the pupils

We ensure that we use our assessment for learning/ pre-unit quizzes to build up from the children's starting points. Due to the high number of EAL and NTE children, we ensure we revisit vocabulary and concepts before progressing to our current area of learning. Differentiation happens in many ways, including but not limited to; outcome, support, task and through visual or practical activities. Even though we teach in mixed year group teams (year 3-4 and year 5-6), each class teacher will adapt work accordingly so the same skills can be taught but through target support for their class. Pre-unit quizzes can be differentiated accordingly to support the needs of all pupils by rewording the question or using sentence stems, tick boxes and images.

Date	
Subject/s	Science
Pre-unit Quiz	
Area	Earth and Space
Subject knowledge (Prior learning: Year 1 Seasons)	

Draw a picture to represent this different seasons and write the name of them

Describe what happens during each season.

Why do different seasons happen?

Working scientifically
(prior learning Upper key stage 1 –Autumn 1 and Lower key stage 2)

Recording data.

You want to find out the temperature fluctuation (change in temperature) over three days in Summer and 3 days in Autumn. **Tick the statement you agree with.**

Jamie says

I think we should use a thermometer. I can then write this down every hour for three days.

☐

Nile says

I think we should just guess the temperature. If we need a coat, we know it will be cold!

☐

Sarah says

I think we should use a data logger. The screen will tell us the exact answer from the sensor and we can record the data continuously over the 3 days.

☐

Observation.

Look at this image of a leaf in summer then over time into Autumn, **tick the box that shows the best observation.**

☐ 'The leaf has gone from green, to yellow, to brown.'

☐ 'The leaf has decayed over time. Over a long period of time, it has become brown, dry and crispy. It has started to fall apart.'

☐ 'In conclusion, the leaf has fallen off the tree. It has no water and the nutrients are unable to get to it. I think this is because the plant cannot photosynthesise.'

Date	
Subject/s	Science
Pre-unit Quiz	
Area	Earth and Space

Subject knowledge (Prior learning: Year 1 Seasons)

Draw a picture to represent this different seasons and write the name of them

Describe what happens during each season

Why do different seasons happen?

Working scientifically
(prior learning Upper key stage 1 –Autumn 1 and Lower key stage 2)

Recording data.

You want to find out the change in temperature over three days in Summer and 3 days in Autumn. Tick the statement you agree with.

Jamie says

I think we should use a thermometer. I can then write this down every hour for three days.

☐

Nile says

I think we should just guess the temperature. If we need a coat, we know it will be cold!

☐

Sarah says

I think we should use a data logger. The screen will tell us the exact answer from the sensor and we can record the data continuously over the 3 days.

☐

SEND, EAL and Higher Attaining Pupils

SEND

All pupils who are on the SEND register at Firs will have a personalised plan. This will either be an IPM (Individual Provision Map) or MEP (Multi-Element Plan). Within the plan, the children will have personalised targets and provisions that are put in place to support the child in meeting targets. If the target links to science or foundation subjects, the provisions may be techniques that are put in place to include children in whole class learning or interventions that support the children's learning outside of the science lesson time.

In science, most SEND children will follow the same lesson structure as others. Where written work may not be appropriate for that child, practical learning may take place and images or a description placed in the child's book for evidence. Cognitive overload is also taken to into account, so the child can take focus on that specific learning objective, for example, a scribe may be used so a child does not also have to concentrate on their phonetic sounds. All SEND children will be exposed to age-related objectives but how they attempt those objectives will differ as the class teacher scaffolds the learning for their needs. We use practical learning, such as practical investigations, to engage with most of our pupils.

EAL

For our children who have English as an Additional Language or those who are New to English, they will be given appropriate inclusive adaptions. We use communication Inprint (images underneath steps to success), to support our children read the required targets. In lessons, you may find visual images to support the acquisition of new vocabulary. The children who require it may have more direct work focusing on keywords and images to support their understanding, as opposed to high levels of written work.

High Attaining Pupils

Stretch and challenge will be evident for the pupils in a variety of different ways:

- ✓ Teacher questioning either during the whole class input or 1:1
- ✓ Expectations of vocabulary used within the lesson
- ✓ Expectations of using mastery language within their answers (either written or orally): prove it, explain it, convince me
- ✓ Orange bubbles for further challenge in response to their current work or after the lesson has ended (the purple pen of progress)

Subject Curriculum and Progression Overview

	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum	**Understanding the World ELG** (The Natural World ELG) Children at the expected level of development will: -Explore the natural world around them, making observations and drawing pictures of animals and plants	**1. Plants**					
		a) identify and name a variety of common wild and garden plants, including deciduous and evergreen trees b) identify and describe the basic structure of a variety of common flowering plants, including trees	c) observe and describe how seeds and bulbs grow into mature plants d) find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	e) identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers f) 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 g) investigate the way in which water is transported within plants *h)* explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal			
		2. Animals, Including Humans					

	-Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class -Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter	a) identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals b) identify and name a variety of common animals that are carnivores, herbivores and omnivores c) describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) d) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	e) notice that animals, including humans, have offspring which grow into adults f) find out about and describe the basic needs of animals, including humans, for survival (water, food and air) g) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	h) 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 i) identify that humans and some other animals have skeletons and muscles for support, protection and movement	j) describe the simple functions of the basic parts of the digestive system in humans k) identify the different types of teeth in humans and their simple functions l) construct and interpret a variety of food chains, identifying producers, predators and prey	*m)* describe the changes as humans develop to old age	n) identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood o) recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function p) describe the ways in which nutrients and water are transported within animals, including humans
		3. Living Things and Their Habitats					
			a) explore and compare the difference between things that are living, dead, and things that have never been alive b) identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other c) identify and name a variety of plants and animals in their habitats, including micro-habitats d) 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		e) recognise that living things can be grouped in a variety of ways f) explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment g) recognise that environments can change and that this can sometimes pose dangers to living things	h) describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird i) describe the life process of reproduction in some plants and animals	j) 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 k) give reasons for classifying plants and animals based on specific characteristics

		4. Evolution and Inheritance					
							a) recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago b) recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents c) identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
		5. Light and Sound					
				a) recognise that they need light in order to see things and that the dark is the absence of light b) notice that light is reflected from surfaces c) recognise that light from the sun can be dangerous and that there are ways to protect their eyes d) recognise that shadows are formed when the light from a light source is blocked by a solid object e) find patterns in the way that the size of shadows changes	f) identify how sounds are made, associating some of them with something vibrating g) recognise that vibrations from sounds travel through a medium to the ear h) find patterns between the pitch of a sound and features of the object that produced it i) find patterns between the volume of a sound and the strength of the vibrations that produced it j) recognise that sounds get fainter as the distance from the sound source increases		k) recognise that light appears to travel in straight lines l) 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 m) 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 n) use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

		6. Electricity					
					a) identify common appliances that run on electricity b) construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers c) 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 d) recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit e) recognise some common conductors and insulators, and associate metals with being good conductors		f) Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit g) 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 h) use recognised symbols when representing a simple circuit in a diagram
		7. Forces and Magnets					

				a) compare how things move on different surfaces b) notice that some forces need contact between two objects, but magnetic forces can act at a distance c) observe how magnets attract or repel each other and attract some materials and not others d) compare and group together a variety of everyday materials on the basis on whether they are attracted to a magnet, and identify some magnetic materials e) describe magnets as having two poles f) predict whether two magnets will attract or repel each other, depending on which poles are facing		g) explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object h) identify the effects of air resistance, water resistance and friction, that act between moving surfaces i) recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	
		8. Seasonal Change and Earth and Space					
		a) observe changes across the four seasons b) observe and describe weather associated with the seasons and how day length varies				c) describe the movement of the Earth, and other planets, relative to the Sun d) describe the movement of the Moon relative to the Earth e) describe the Sun, Earth and Moon as approximately spherical bodies f) use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	
		9. Materials, Properties and Changes of Materials, and States of Matter					

		a) distinguish between an object and the material from which it is made b) identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock c) describe the simple physical properties of a variety of everyday materials d) compare and group together a variety of everyday materials on the basis of their simple physical properties	e) identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses f) find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	g) compare and group together different kinds of rocks on the basis of their appearance and simple physical properties h) describe in simple terms how fossils are formed when things that have lived are trapped within rock i) recognise that soils are made from rocks and organic matter	j) compare and group materials together, according to whether they are solids, liquids or gases k) 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) l) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	m) 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 n) know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution o) use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating p) give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic q) demonstrate that dissolving, mixing and changes of state are reversible changes r) 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	
		10. Working Scientifically					

		a) ask simple questions and recognise that they can be answered in different ways b) observe closely, using simple equipment c) perform simple tests d) gather and record data to help in answering questions e) identify and classify f) use their observations and ideas to suggest answers to questions	g) ask relevant questions and use different types of scientific enquiries to answer them h) set up simple practical enquiries, comparative and fair tests i) make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers j) record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables k) gather, record, classify and present data in a variety of ways to help in answering questions l) identify differences, similarities or changes related to simple scientific ideas and processes m) report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions n) use straightforward scientific evidence to answer questions or to support their findings o) use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	p) plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary q) take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate r) record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs s) identify scientific evidence that has been used to support or refute ideas or arguments t) report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations u) use test results to make predictions to set up further comparative and fair tests

Coverage by Topic and Vocabulary		**Enchanted Woodland** Year 1: 1a, 1b, 10a, 10b, 10d, 10e, 10f Year 2: 1c, 1d, 10a, 10b, 10d, 10e, 10f *Year 1: identify, describe, name, common, wild, garden, deciduous, evergreen, tree, plant, structure, leaf, stem, petal, root, trunk, branch* *Year 2: observe, describe, seeds, bulbs, grow, mature, plants, water, light, dark, temperature, healthy, soil, seedling, warm, cool, hot, cold* ***Investigation: Are all leaves the same?*** *Investigation vocabulary: question, answer, gather, record, identify, classify, sort, label, observe, observation, same, different, similar* **Moon Zoom** Year 1: 8a 8b, 10b, 10c, 10d, 10f Year 2: 10b, 10c, 10f *Year 1: observe, change, season, Autumn, Spring, Summer, Winter, weather, hot, cold, dun, snow, rain, wind, cloud, night, day, sunrise, sunset* ***Year 1 Investigation: Weather investigations e.g. wind diary or rain gauge*** *Investigation vocabulary: question, answer, observe, gather, record* ***Year 1 and 2 investigation: Fizzy bottle rockets*** *https://www.rigb.org/docs/fizzybottlerockets_infosheet_v2_0.pdf* *Investigation vocabulary: question, answer, observe, test, experiment, fuel, rocket, gas, propel, chemical reaction, predict* **Muck, Mess and Mixtures** Year 1: 2d, 10a, 10b, 10c, 10e Year 2: 2f, 2g, 10a, 10b, 10c, 10d, 10f *Year 1: identify, name, human, body, eyes, ears, nose, mouth, arms, hands, head, face, legs, feet, knees, elbows, shoulders, hips, fingers, toes, sight, sound, seeing, hearing, touch, feel, texture, taste, sweet, sour, bitter, salty, smell*	**Gods and Mortals** 6a, 6b, 6c, 6d, 6e 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10σ *Appliance, electricity, series circuit, cells, wires, bulbs, switches, buzzers, battery, lamp, loop, conductor, insulator, metal* ***Investigation: Conductors and Insulators*** *file:///C:/Users/lpugh/Downloads/Conductors_And_Insulators.pdf* *Investigation Vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, Venn diagram, record, classify, data, differences, similarities, material, evidence, findings, predictions,* **Urban Pioneers** 1e, 1f, 1g, 1h 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10σ *Function, flowering, roots, stem, trunk, leaves, flowers, life, growth, requirement, air, light, water, nutrients, soil, transported, life cycle, pollination, seed, formation, dispersal* ***Investigation: Room for Growth*** *https://www.farmafrica.org/downloads/2016-ghtb/science-ks2---plant-growth-2017.pdf* *Investigation Vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, data, differences, similarities, evidence, findings, predictions, conditions, factors* **Predator** 2h, 2i, 2l, 3e, 3f, 3g 10g, 10i, 10j, 10k, 10l, 10m, 10n *Animals, humans, nutrition, skeletons, muscles, support, protection, movement, food chain, interpret, producers, predators, prey, group, classification key, environment, habitat, endangered, extinct, classify, mammals, reptiles, amphibians, birds, fish* ***Investigation: Habitats, Soil Soup*** *https://www.sustainablelearning.com/resource/habitats-investigation-lower-ks2*	**A Child's War** 7g, 7h, 7i 10p, 10q, 10r, 10s, 10t, 10u *Unsupported, object, fall, Earth, gravity, air resistance, water resistance, friction, surfaces, mechanism, lever, push, pull, pulley, gear, force, effect, weight, heavy, light, effect* ***Investigation: Slipping and Sliding; testing friction*** *https://www.science-sparks.com/slipping-and-sliding/* *Investigation vocabulary: enquiry, control, variable, measurement, precision, accuracy, repeat reading, record, data, table, scatter graph, bar graph, line graph, evidence, support, refute, report, present, findings, conclusions, causal relationships, explanation, degree of trust, predictions, comparative, fair, test* **Frozen Kingdom** 3j,3k 10q, 10r, 10s, 10t *classify, characteristics, similarities, differences, micro-organisms, plants, animals, producer, prey, predator, mammal, amphibian, reptile, bird, fish, invertebrate, insect, arachnid* ***Investigation: Melting Polar Ice Caps*** *https://www.science-sparks.com/melting-polar-ice-caps/* *Investigation vocabulary: measurement, centimetres, millimetres, water level, sea level, melt, ice caps, habitat, temperatures, climate change, record, diagram, line graph, evidence, refute, support, findings, conclusions, causal relationships* **Bloodheart** 2n, 2σ, 2p 10r, 10t ***heart, blood, blood vessels, veins, arteries, nutrients, water, oxygen, waste, exercise, drugs, alcohol,***

		Year 2: needs, humans, survive, survival, water, food, air, oxygen exercise, food, hygiene, healthy, unhealthy, weight, energy, sleep, rest, fruit, vegetables, carbohydrates, dairy, meat, eggs, sugar ***Year 1 Investigation: Senses Investigations*** *https://kidshealth.org/en/kids/experiment-main.html* *Investigation vocabulary: question, answer, observe, test, classify, identify, predict* ***Year 2 Investigation: Egg Shell/healthy teeth investigation*** *https://www.science-sparks.com/how-to-keep-teeth-healthy/* *Investigation vocabulary: question, answer, observe, test, record, change, similar, different, same, toothpaste, acid, protect, damage, predict* **Rio de Vida** Year 1: 2a, 2b, 2c Year 2: 2e, 3a, 3b, 3c, 3d *Year 1: fish, amphibians, reptiles, birds, mammals, goldfish, frog, toad, newt, snake, lizard, mouse, cat, dog, pig, sheep, horse, cow, goat, chicken, pigeon, owl, blackbird, carnivore, herbivore, omnivore, fins, scales, tail, beak, wing, snout, legs, feet, paws, talons, claws, trotters, hooves, toes, skin, fur, feathers* *Year 2: Foal, piglet, calf, lamb, tadpole, caterpillar, kitten, puppy, egg, hatch, baby, adult, offspring, living, dead, never alive, habitat, home, live, needs, suited, animals, plants, trees, nest, ground, sky, water, river, pond, farm, forest, garden, food, food chain, predator, prey, herbivore, carnivore, omnivore, wild, domestic, seeds, nuts, berries* **Street Detective** Year 1: 1a, 1b Year 2: 1c, 1d *Year 1: identify, describe, name, common, wild, garden, deciduous, evergreen, tree, plant, structure, leaf, stem, petal, root, trunk, branch*	*Investigation Vocabulary: observe, record, differences, similarities, change, survey, grounds, wildlife, survival, soil, pollinators, sites, ecologists, wildlife corridors, record, map, identify, explore, investigate, soil, ingredients, pollinators, wildflowers* **Playlist** 5f, 5g, 5h, 5i, 5j 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10σ *Sound, vibrate, vibration, vibrating, medium, ear, pitch, low, high, sound wave, volume, loud, quiet, distance* ***Investigations: How does sound travel through solids, liquids and gases?*** • *Hydrophone Experiment: https://www.ogdentrust.com/assets/general/Phizzi-Practical-Make-a-hydrophone_for-website.pdf* • *'See the Sound' and 'Classic Paper Cup and String Phone' Experiments https://www.kidsacademy.mobi/storytime/sound-science-experiments/* *Investigation vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, classify, data, differences, similarities, material, evidence, findings, predictions, solid, liquid, gas* **Tribal Tales** 5a, 5b, 5c, 5d, 5e 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10σ *light, dark, reflected, reflect, reflection, surface, sun light, protection, shadow, absence, light source, solid, opaque, transparent* ***Investigation: Shadow Size*** *file:///C:/Users/lpugh/Downloads/Investigating_Shadow_Size.pdf* *Investigation vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, data, differences, similarities, evidence, findings, predictions, width, measurement*	***cigarettes, diet, lifestyle, healthy, unhealthy, function, circulate, circulatory system, pulse, heart rate*** ***Investigation: Dissecting Sheep's Heart*** *https://www.instructables.com/id/Heart-Dissection/* *Investigation vocabulary: diagram, label, explanation, dissect, valves, ventricles, atrium* **Darwin's Delights** 4a, 4b, 4c 10p, 10t *Change, time, fossils, information, inhabit, inhabited, Earth, dinosaurs, prehistoric, skeleton, offspring, vary, identical, adapt, adapted, environment, evolution, extinct* ***Investigation – Who has the best beak? Understanding why birds have different beaks.*** *https://www.stem.org.uk/resources/elibrary/resource/33665/education-pack-seeds-and-fruits-adaptation* *https://www.tes.com/teaching-resource/bird-beaks-6267561* *Investigation vocabulary: predict, enquiry, variable, report, present, explanation* **Off With Her Head** 5k, 5l, 5m, 5n 10p, 10q, 10r, 10s, 10t, 10u *Light, travel, straight, waves, reflect, light source, eyes, objects, shadows, cast* ***Investigations: Yr 6 Light Investigations*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=_view_unit&unit=6d* *Investigation vocabulary: enquiry, control, variable, measurement, precision, accuracy, repeat reading, record, data, table, scatter graph, bar graph, line graph, evidence, support, refute, report, present, findings, conclusions, causal relationships, explanation, degree of trust, predictions, comparative, fair, test, diagram, spectrum, periscope, angle* **Stargazers**

		Year 2: observe, describe, seeds, bulbs, grow, mature, plants, water, light, dark, temperature, healthy, soil, seedling, warm, cool, hot, cold **Land Ahoy** Year 1: 9a, 9b, 9c, 9d, 10a, 10b, 10c, 10d, 10e, 10f Year 2: 9e, 9f, 10a, 10b, 10c, 10d, 10e, 10f *Year 1: object, material, identify, wood, plastic, glass, metal, water, rock, fabric, properties, hard, soft, smooth, rough, bend, stretch, twist, rigid, compare, same, different, similar, waterproof, light, heavy, float, sink, dissolve* *Year 2: identify, compare, suitable, unsuitable, materials, wood, metal, plastic, glass, brick, rock, paper, cardboard, squash, bend, stretch, twist, shape, change, waterproof, light, heavy, float, sink, dissolve* ***Investigation: Waterproofing coins*** *-* *https://www.science-sparks.com/protect-the-pirate-coins-waterproofing-activity/* *Investigation vocabulary: question, answer, observe, test, record, change, similar, different, identify, classify, sort, observe, observation, predict* **Bright Lights, Big City** Year 1: 9a, 9b, 9c, 9d, 10a, 10b, 10c, 10d, 10e, 10f Year 2: 9e, 9f, 10a, 10b, 10c, 10d, 10e, 10f *Year 1: object, material, identify, wood, plastic, glass, metal, water, rock, fabric, properties, hard, soft, smooth, rough, bend, stretch, twist, rigid, compare, same, different, similar* *Year 2: identify, compare, suitable, unsuitable, materials, wood, metal, plastic, glass, brick, rock, paper, cardboard, squash, bend, stretch, twist, shape, change* ***Investigation: Protect the egg – Egg Drop Challenge*** *https://www.tes.com/teaching-resource/egg-drop-challenge-6408374*	**Heroes and Villains** 5a, 5b, 5c, 5d, 5e 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10o *light, dark, reflected, reflect, reflection, surface, sun light, protection, shadow, absence, light source, solid, opaque, transparent* *Investigations: Reflective materials* *https://www.tes.com/teaching-resource/reflections-and-mirrors-6163976* *Investigation vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, data, differences, similarities, evidence, findings, predictions, width, measurement, shiny, matt, dull* **Tremors** 9g, 9h, 9i, 9j, 9k 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10o *Compare, group, same, different, similar, appearance, properties* *Sedimentary, metamorphic, igneous, fossil, formed, soil, rock, organic matter, solid, liquid, gas, state, matter, heat, cool, melt, burn, evaporate, temperature, degrees, Celcius, boil, freeze* ***Investigation: Rock suitability*** *(e.g.* *https://www.tes.com/teaching-resource/rocks-and-soils-science-investigation-6403906)* *Investigation vocabulary: purpose, permeability, durability, enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, data, differences, similarities, evidence, findings, predictions* **Burps, Bottoms, Bile** 2j, 2k 10g,10h,10i, 10j, 10m *mouth, oesophagus, stomach, small intestine, large intestine, gallbladder, pancreas, liver, saliva, rectum, digest, nutrition, nutrients, waste, urine, faeces, teeth, gums, tongue incisors, canines, pre-molars and molars, cut, tear, grind, crush*	8c, 8d, 8e, 8f 10r, 10s, 10t *Earth, Sun, planets, solar system, relative, moon, orbit, spherical, rotation, axis, day, night, sky, stars, galaxy, universe, gravity* ***Investigations: Yr 5 Earth and Space Investigations*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=5d* ***Orbit modelling*** *https://www.bbc.co.uk/bitesize/clips/zkynvcw* *https://www.bbc.co.uk/bitesize/clips/z3jd7ty* *Investigation vocabulary: record, diagram, label, evidence, refute, support, report, present, conclusion, explanation, presentation* **Alchemy Island** 9m, 9n, 9o, 9p, 9q, 9r 10p, 10r, 10t, 10u *Compare, group, properties, hardness, solubility, transparency, conductivity, electrical, thermal, response, magnets, attract, repel, opaque, transparent, dissolve, liquid, solution, recover, substance, solid, gas, mixture, separate, filter, sieve, evaporate, comparative, fair, test, evidence, metals, wood, plastic, state, reversible, irreversible, burning, action, acid, bicarbonate of soda* ***Investigations: Separating Solutions, Separating Mixtures and Reversible and Irreversible Changes*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=5c* *Investigation vocabulary: enquiry, variable, data, results, diagram, label,report, present, findings, conclusions, predictions, comparative, fair, tests* **Pharaohs** 6f, 6g, 6h *Brightness, lamp, bulb, volume, buzzer, voltage, cells, circuit, electricity, electrical, components, switches, wires, symbol, series circuit, diagram* ***Investigation: Making traffic lights*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=6e*

		Investigation vocabulary: question, answer, observe, test, record, change, similar, different, same, identify, classify, sort, observe, observation, predict **Superheroes** Year 1: 2d, 10a, 10b, 10c, 10d, 10e, 10f Year 2: 2f, 2g, 10a, 10b, 10c, 10d, 10e, 10f Year 1: *identify, name, human, body, eyes, ears, nose, mouth, arms, hands, head, face, legs, feet, knees, elbows, shoulders, hips, fingers, toes, sight, sound, seeing, hearing, touch, feel, texture, taste, sweet, sour, bitter, salty, smell* *Year 2: needs, humans, survive, survival, water, food, air, oxygen exercise, food, hygiene, healthy, unhealthy, weight, energy, sleep, rest, fruit, vegetables, carbohydrates, dairy, meat, eggs, sugar* ***Year 1 Investigation: Senses Investigations*** *https://kidshealth.org/en/kids/experiment-main.html* *Investigation vocabulary: question, answer, observe, test, classify, identify, predict* ***Year 2 Investigation: Egg Shell/healthy teeth investigation*** *https://www.science-sparks.com/how-to-keep-teeth-healthy/* *Investigation vocabulary: question, answer, observe, test, record, change, similar, different, same, toothpaste, acid, protect, damage, predict* **Paws, Claws and Whiskers** Year 1: 2a, 2b, 2c, 10a, 10b Year 2: 2e, 2f, 3a, 3b, 3c, 3d, 10a, 10b *Year 1: fish, amphibians, reptiles, birds, mammals, goldfish, frog, toad, newt, snake, lizard, mouse, cat, dog, pig, sheep, horse, cow, goat, chicken, pigeon, owl, blackbird, carnivore, herbivore, omnivore, fins, scales, tail, beak, wing, snout, legs, feet, paws, talons, claws, trotters, hooves, toes, skin, fur, feathers* *Year 2: Foal, piglet, calf, lamb, tadpole, caterpillar, kitten, puppy, egg, hatch, baby, adult, offspring, living, dead, never alive, habitat, home, live, needs, suited, animals, plants, trees, nest, ground, sky, water, river, pond, farm, forest, garden, food, food chain, predator, prey, herbivore, carnivore, omnivore, wild,*	***Investigation: Show the digestive system using food and a pair of tights.*** *https://www.stem.org.uk/resources/elibrary/resource/35396/digestive-system-experiment* *Investigation vocabulary: practical, enquiry, observation, record, explanation, present, diagram* **Mighty Metals** 7a, 7b, 7c, 7d, 7e, 7f 10g, 10h, 10i, 10j, 10k, 10l, 10m, 10n, 10σ *Friction, fast, slow, push, pull, contact, magnetic, forces, attract, repel, materials, compare, group, poles, north pole, south pole, predict* ***Investigation: Magnetism through Materials*** *file:///C:/Users/lpugh/Downloads/Magnetism_Through_Materials.pdf* *Investigation vocabulary: enquiry, practical, comparative, fair, test, systematic, observation, findings, table, record, data, differences, similarities, evidence, findings, predictions, Venn diagram* **Blue Abyss** 3e, 3f, 3g, 9l, 2l 10g,10h,10i, 10j, 10m *Group, classify, classification key, mammals, reptiles, amphibians, birds, fish, environment, habitat, endangered, extinct, evaporation, condensation, precipitation, transpiration, vapor, water cycle, river, lake, sea, ocean, mountain, cloud, mouth, source, food chain, predator, prey, producer* ***Investigation: Water cycle investigation*** *https://www.science-sparks.com/make-a-mini-water-cycle/* *Investigation vocabulary: practical, enquiry, observation, record, explanation, present, diagram*	**Time Traveller** 2m, 3h, 3i 10r, 10s, *Foetus, baby, toddler, infant, child, teenager, puberty, old age, elderly, physical changes, emotional changes, reproduce, life cycle, gender, hormones, period, gestation, frail, mammal, amphibian, insect, bird, egg, hatch, birth, milk, reproduction, seed, pollination, nectar, pollinator, mate* ***Investigations: Vegetative reproduction*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=5a* *Investigation vocabulary: diagram, label* ***Foetal Development*** *https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=5b* *Investigation vocabulary: line graph, data, measurement, evidence, support, refute*

		domestic, seeds, nuts, berries, needs, humans, survive, survival, water, food, air, oxygen ***Investigation: (If possible) Frogspawn to Tadpole; growth and change - observation over time.*** *Investigation vocabulary: grow, change, frogspawn, tadpole, tail, legs, head, body, egg, observe* **Scented Garden** Year 1: 1a, 1b, 8a, 8b, 10a, 10b, 10c, 10d, 10f Year 2: 1c, 1d, 10a, 10b, 10c, 10d, 10f *Year 1: identify, describe, name, common, wild, garden, deciduous, evergreen, tree, plant, structure, leaf, stem, petal, root, trunk, branch, observe, change, season, Autumn, Spring, Summer, Winter, weather, hot, cold, dun, snow, rain, wind, cloud, night, day, sunrise, sunset* *Year 2: observe, describe, seeds, bulbs, grow, mature, plants, water, light, dark, temperature, healthy, soil, seedling, warm, cool, hot, cold* ***Investigation: Observe and record the growth of plants as they change over time - setting up comparative tests to show what plants need to stay healthy.*** *Investigation vocabulary: observe, record, predict, compare, test, same, different* **Dinosaurs** Year 1: 10a, 10d, 10e, 10f Year 2: 3a, 10a, 10d, 10e, 10f *Year 1: dinosaur, fossil, extinct* *Year 2: Compare, same, different, similar, living, dead, never alive, extinct, endangered, fossil, skeleton, breathe, move, reproduce, dinosaur* ***Investigation: Did all dinosaurs have the same body parts?*** *Investigation vocabulary: question, answer, gather, record, identify, classify, sort, label, observe, tail, legs, horns, frill, plates, claws, same, different, similar* **Towers, Turrets and Tunnels** Year 1: 9a, 9b, 9c, 9d, 10a, 10c, 10d, 10e, 10f		

		Year 2: 9e, 9f, 10a, 10c, 10d, 10e, 10f *Year 1: object, material, identify, wood, plastic, glass, metal, water, rock, fabric, properties, hard, soft, smooth, rough, bend, stretch, twist, rigid, compare, same, different, similar, strong, weak* *Year 2: identify, compare, suitable, unsuitable, materials, wood, metal, plastic, glass, brick, rock, paper, cardboard, squash, bend, stretch, twist, shape, change, strong, weak* ***Investigation: The Billy Goats Gruff;*** **Children to design and choose materials to build a bridge. Which will be the strongest? Build a variety of bridges from various materials and find out which is the strongest by putting on a weight/ object to see if it holds.** *Investigation vocabulary: predict, test, record, weight, heavy, light, observation*		

Knowledge Retention

Science is a progressive subject, developing knowledge on different areas of biology and physics in each year group taught. By following the National Curriculum, we can ensure that our science lessons enable the pupils to make good progress in science. However, as not all elements of science are taught every year due to the two-year cycle it is necessary to ensure that we can assess whether children have retained what they have been taught previously. This is done through a pre-unit quiz. This also enables us to identify starting points for new pupils (both direct entrants and pupils from other schools) and allows us to plan effective lessons to meet the needs of the pupils. Here at Firs primary school, we have a high level of transience, which may lead to children arriving at different starting points, as well as those who are New to English (NTE) or have English as an additional language (EAL).

The pre-unit quiz should be based on the prior learning that feeds into the current topic. These questions should be based on the knowledge that Forever Firs children would have been taught in previous years.

For example, years 3-4 having a topic of 'rocks' (taken from the year 3 objective) would have a pre-unit quiz based around 'Uses of everyday materials' that year 2 would have learnt.

The rationale behind this is due to high transience within the school or through gaps in attainment, children may be entering with misconceptions or missing concepts, which are needed before they can be taught the current area of learning, to ensure children will sequentially understand concepts and vocabulary.

The Pre-unit quiz will be marked to ensure any unknown concepts/ misconceptions have been addressed, where appropriate, extra lessons or mini additional inputs may be required to ensure children have the knowledge and skills needed to undertake their next lesson.

Examples

Year 3/4 - Animals Including Humans

Year 1 Objectives	Year 2 Objectives
♣ identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ♣ identify and name a variety of common animals that are carnivores, herbivores and omnivores ♣ describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) ♣ identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	♣ 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.

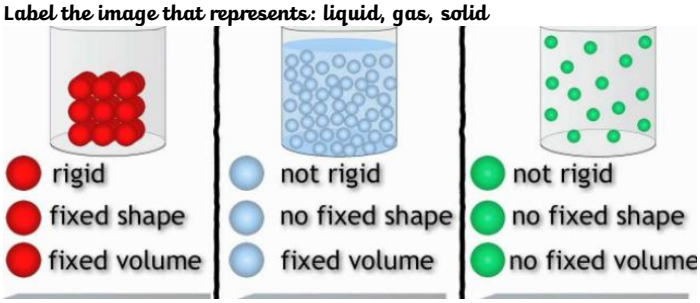
Year 5/6 Cycle B – Spring 1 – Light

Year 1 Prior Learning	Year 2 Prior Learning	Year 3 Prior Learning	Year 4 Prior Learning
Everyday materials Pupils should be taught to: • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties	**Uses of everyday materials** 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		**States of matter** 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 (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Date		
Subject/s	Science	
Pre-unit Quiz		
Area	**Properties and Changes of Materials**	

Subject knowledge (Prior learning: Year 1 Changing Materials; Year 2 Uses of Everyday Materials; Year 4 States of Matter)

Label the image that represents: liquid, gas, solid



Write the name of something that is a:

Solid _____

Liquid _____

Gas _____

What is evaporation? Can you give an example?

heat water liquid °C gas steam flow vapour

1. Glass is:
   - a. transparent ☐
   - b. able to block light ☐
   - c. a light source ☐

2. Steel is:
   - a. found growing on trees ☐
   - b. a metal ☐
   - c. soft ☐

3. Rubber is:
   - a. transparent ☐
   - b. always black ☐
   - c. bendy ☐

4. Wood is:
   - a. transparent ☐
   - b. natural ☐
   - c. opaque ☐

5. Plastic is:
   - a. made in a factory ☐
   - b. made from seashells ☐
   - c. made in the ground ☐

Working scientifically

Describe what a hypothesis is:

When is the best time to record data from the experiment?

☐ Before you have carried out the experiment ☐ Straight after finding the result ☐ Once you have had a discussion about what you can see

The pre-unit quiz has been updated as of Spring 2 (2022), which will now include a section for working scientifically. These questions may be taken from the previous year 5/6 term or the year 4 working scientifically objectives. This can be selected from previous topics learning because children should be using these methods continuously throughout each topic, in each year group for Key stages 1 and 2. The pre-unit quiz aims to assess children's current knowledge of a concept to enable teachers to plan effective lessons that will meet the outcomes of their current objectives been taught.

There will be a minimum amount of questions set for each year group:

- KS1 – 3-5 questions (minimum 1 working scientifically question)
- Lower Key stage 2 – 4-6 questions (minimum 2 working scientifically questions)
- Upper Key stage 2 – 5-7 questions (minimum 2 working scientifically questions)

Assessment

At the end of every half term when science is taught, the teacher will assess their class against the NC and progression guidance for that unit of science. The teacher may choose to use additional materials to aid their teacher assessment such as the end of unit tests, KWL grids etc. but assessment will be primarily from work that is done in class.

The teacher will assess each child under 4 headings:

Children working below ARE	Children working towards ARE	Children working at ARE	Children working above ARE

This can be found in the *Topic booklet for each year group's half term unit.*

As of Summer 1 (2022), the whole school will be using Topic assessment quizzes. These are to be carried out at the end of a unit, to assess the key knowledge retained by the children. These will be the 'golden nuggets' of information that all children need as a core piece of knowledge. There will be Science questions within the quiz to assess the knowledge that has been retained. There is no set number of questions required, however, it should reflect the key elements of the unit and be based around those 'golden nuggets' that all children are required to know for their year group.

Investigations

When teaching science at Firs, we aim to make the subject as exciting as possible to get the children enthusiastic about science. We aim to do at *least one* practical activity or experiment for every unit of science taught. The activities may link to the Cornerstones topic or maybe discreetly linked to the area of science. There will be evidence of the activities taking place either through photographs and a short description or a write up of the experiment. These suggestions are not an exhaustive list and may change the order/ investigation that is planned. See *Investigation Ideas Document* for examples.

All the curriculum in EYFS will be taught practically. This will be in taught sessions as well as access to materials within the continuous provision.

Progression through experiments

Our progression documents outline how the children will develop their skills within scientific enquiry and within experiments. This can be found in the *Working Scientifically Skills progression document* and *Investigation write up progression document.* These documents enable children to use the correct scientific skills and build on them throughout their scientific journey.

As children take part in different experiments and investigate key questions, they will begin to record what they have done.
In each year group children will be expected to write up their experiment under the subheadings below and use the key vocabulary.
Differentiation: For 'not there yet' classes, children will still be expected to write up their experiments and use the required vocabulary for their age group, but this may be scaffolded using STEM sentences or providing the children with images to circle.

	National Curriculum	Subheadings	Key Vocabulary
EYFS	In EYFS, teachers will model the scientific vocabulary that the children will be exposed to in year 1 and begin to expect the children to reuse it in context. Evidence can be seen in the whole class topic book.		
Year 1/2	♣ asking simple questions and recognising that they can be answered in different ways ♣ observing closely, using simple equipment ♣ performing simple tests ♣ identifying and classifying ♣ using their observations and ideas to suggest answers to questions ♣ gathering and recording data to help in answering questions.	• Question • What I think will happen • What we did • Result • What I found out • What I know now (Linked to what they have learnt. I can now say… E.g. In an investigation on insulating materials. I know the best material to make a lunch box out of is…..	• Results • Tables

Year 3/4	♣asking relevant questions and using different types of scientific enquiries to answer them
	♣ setting up simple practical enquiries, comparative and fair tests
	♣ making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
	♣ gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
	♣ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
	♣ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
	♣ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
	♣ identifying differences, similarities or changes related to simple scientific ideas and processes
	♣ using straightforward scientific evidence to answer questions or to support their findings.
		• Question. What are you investigating?
		• Prediction
		• Equipment
		• Variables
		  ○ What am I going to change?
		  ○ What am I going to keep the same?
		  ○ What am I going to measure?
		• How do I know my test is fair?
		• Results
		• Labelled Diagram
		• Conclusion
		• What I'd change or do next time.
			• Predict
			• Equipment
			• Variables
			• Fair test
			• Bar Charts
			• Diagrams
			• Tables

Year 5/6	♣planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
	♣ taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
	♣ recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
	♣ using test results to make predictions to set up further comparative and fair tests
	♣ reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
	♣ identifying scientific evidence that has been used to support or refute ideas or arguments.
		• Question. What are you investigating?
		• Hypothesis.
		  ○ Prediction and Explanation
		• Variables
		  ○ Independent variable (what you are changing)
		  ○ Dependent variable (what you are measuring)
		  ○ Control variable (what you are keeping the same)
		• Equipment
		• Method and Labelled Diagrams
		• Results
		• How I know my test was fair.
		• Were there any anomalies? Why do you think this was?
		• Conclusion
			• Hypothesis
			• Prediction
			• Variables
			  ○ Independent
			  ○ Dependent
			  ○ Control
			• Equipment
			• Table
			• Scatter Graph
			• Line Graph
			• Bar Chart
			• Anomaly
			• Fair Test

KS1	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a Yes/No questions to aid sorting	Identify the headings for the two groups (it is …., it is not ….)	Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc.			Sort objects and living things into two group using a basic Venn diagram or simple table	Talk about the number of objects in each group i.e. which has more or less	Children in KS1 are not expected to draw conclusions. They are expected to make observations which will help them to answer questions. They do not have the subject knowledge to give reasons for what they observe so they cannot draw scientific conclusions.	Children in KS1 are not expected to make scientific predictions as they do not have the subject knowledge to do this. That does not mean that you should not ask children what they think may happen, but this will be based on experience or may simply be a guess.	Children in KS1 are not expected to evaluate. However, children should be encouraged to consider their method and adapt this where necessary.
Researching	Ask one or two simple questions linked to a topic					Present what they have learnt verbally or using pictures	Be able to answer their questions using simple sentences			
Comparative/fair testing	Identify the question to investigate from a scenario or choose a question from a range provided	Choose equipment to use and decide what to do and what to observe or measure in order to answer the question	Make observations linked to answering the question	When appropriate, measure using standard units where all the numbers are marked on the scale	Record data in simple prepared tables, pictorially or by taking photographs	Present what they learnt verbally, using pictures or block diagrams	Answer their question in simple sentences using their observations or measurements			
Observing over time	Ask a question about what might happen in the future based on an observation				Record data in simple prepared tables, pictorially or by taking photographs	Present what they learnt verbally or using pictures				
Pattern seeking	Ask a question that is looking for a pattern based on observations				Record data in simple, prepared tables and tally charts	Present what they learnt verbally				

LKS2	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a range of Yes/No questions to aid sorting	Be able to put appropriate headings onto intersecting Venn and Carroll diagrams	Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams.			Sort objects and living things into groups using intersecting Venn and Carroll diagrams	Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs	Draw simple conclusions, when appropriate, for patterns e.g. a flying insect with no legs might always crash land		Suggest improvement e.g. a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation.
Researching	Ask a range of questions linked to a topic	Choose a source from a range provided				Present what they learnt verbally or using labelled diagrams	Be able to answer their questions using simple scientific language			Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.
Comparative/fair testing		Decide what to change and what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary	Prepare own tables to record data	Present data in bar charts	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings	Use results from an investigation to make a prediction about a further result	Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.
Observing over time		Decide what to measure or observe. Decide how often to take a measurement.	Make a range of relevant observations	Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time.		Present data in time graphs				

Pattern seeking		Decide what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale.		Use ICT package to present data as a scattergram				

UKS2	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information	Identify specific clear questions that will help to sort without ambiguity	Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry			Create branching databases (tree diagrams) and keys to enable others to name livings things and objects	Be able to talk about the features that objects and living things share and do not share based on the information in the key etc.	Be able to use data to show that livings things and materials that are grouped together have more things in common than with things in other groups		Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for
Researching	Ask a range of questions recognising that some can be answered through research and others may not	Choose suitable sources to use				Present what they learnt in a range of ways e.g. different graphic organisers	Be able to answer their questions using scientific evidence gained from a range of sources			Be able to talk about their degree of trust in the sources they used
Comparative/fair testing	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask	Recognise and control variables where necessary	As for KS1	Measure using standard units using equipment that has scales involving decimals	Prepare own tables to record data, including columns for taking repeat readings	Choose an appropriate form of presentation, including line graphs	Be able to answer their question, describing causal relationships	Provide oral or written explanations for their findings	Use test results to make predictions for further investigations	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled,

Observing over time	further questions based on results.				As for LKS2		Be able to answer their questions, describing the change over time			and accuracy of results
Pattern seeking						Choose an appropriate form of presentation, including scatter graphs	Be able to answer their questions identifying patterns			

Science and Careers

To continue to raise the profile of science within the school we make links to businesses where possible to show children how science is applied in the real world. As of 2021, new career journals have been implemented across the school. These will be used to record different careers that the children will listen to, made by professionals from different roles. They will either come into the school or remotely talk to children about their job and what aspects they need to learn to become successful in that job role. This is designed to raise the profile of a range of opportunities available for children when they are older and inspire them.

The career journals will record a range of speakers within different topics (not exclusive to Science). Each half term, there will be a different speaker to engage with. The children will complete a short profile about this speaker. This career journal will be taken up throughout the school with them. There should be a minimum of 1 speaker linking to STEM/ Science within the year.

Monitoring

Monitoring is done both formally and informally throughout the year this may be done by SLT, MLT or a member of the STEM team.

Some examples of monitoring:

Whole-Class Topic Books	
Topic Books	
Displays in classrooms and the school halls	
Pupil Voice	
Assessment (1/2 Termly Assessment Booklets)	
Teacher Voice	
Planning	
Observations	

Success Criteria:	AO	RR	SS	WW
Learning objectives are used with the long date and consistent font (Twinkl Cursive)				
Success criteria is child friendly and shows the child how to achieve the learning objective				
The task set matches the LO				
Scientific vocabulary (tier 1, 2, 3) expectations for the lesson is clear (e.g. in the LO/SC, word mats, in children's writing, orange challenge bubble)				
There is evidence of science in the whole class topic book				
There is evidence of practical activities/experiments to engage the children				
The progression for experiment write up has been followed				
Further questioning has used (orange bubble) to challenge the children's scientific thinking				
Pre-quizzes are being used to assess children's retention of prior knowledge				

Progression/Curriculum Mapping				
The LO objectives match to the topic booklet objectives				
All of the objectives from the topic booklet are covered/evidenced				
Work is well matched to the ability of the children. Do the children just complete every task with ease? Or is their opportunities for resilience in their learning?				
Marking				
Children have had the opportunity to respond to their marking.				
Misconceptions have been picked up.				
All work is marked in line with the school policy including: Response to marking Bubble marking VF SA & TA				

Other				
Amount of the science lessons in each book in each ½ term				
High presentation can be seen and is encouraged including cursive handwriting				
Expectations of writing in science matches expectations of English				