SCIENCE Curriculum

Intent:

With these aspirations, our INTENT for the SCIENCE curriculum is for pupils to:

- To promote children's curiosity about the world around them and to enable them to answer scientific questions about their world.
- To encourage children to ask and answer questions and to solve problems so they can begin to understand the uses and implications of science today, and for the
- To enable children to explore and solve problems through active, hands-on learning.
- To develop scientific knowledge and understanding through the disciplines of biology, chemistry and physics
- To develop the skills of investigation, including observing, measuring, predicting, explaining, communicating and evaluating.
- To develop the use of scientific language, and enrich their vocabulary to support their understanding of the world around

Implementation

Planning

At Southway Junior School, our Science curriculum follows the National Curriculum objectives and is taught in units throughout the year so children can achieve depth in their learning. We use a range of resources for our planning including resources from Grammasurus, Twinkl, STEM Learning and Primary Science Teacher Trust (TAPS). Units have been carefully sequenced and planned in a cyclical manner to ensure children build on prior learning and make links between the units. For example, in Year 3 children first learn about light including exploring what causes shadows this is then built upon further in the Year 6 light topic, where children look deeper into how we see. Opportunities to ask questions are planned for and activities enable children to problem solve to find solutions. All children are given the opportunity to investigate (working scientifically) in each topic. Pupils are given the opportunity for visits and visitors to bring their science learning to life; for example, visiting Southdown Planetarium, Drusillas, the Gatwick Airport STEM Centre, the British Science Week, the Mid Sussex Science Week competition and visits from local Secondary Schools and businesses.

Recording

At Southway Junior School, children have a science book and work is recorded in writing, diagrams and through photographs. We ensure that time is given to writing a conclusion following an investigation. These conclusions demonstrate the depth of the children's knowledge and understanding, while informing teacher assessment. Retrieval practice tasks enable children to revisit previous learning. Children refer to their book regularly to support retrieval.

Assessment

Science is assessed at the end of each teaching unit and recorded on Bromcom which links directly to the objectives used for planning. Each topic begins with an assessment grid which children populate with their knowledge prior to any learning. This is then revisited post the learning to demonstrate the new knowledge gained in this topic. Teachers use their professional judgement based on both oral and written responses to key enquiry questions. The subject leader looks at assessments and discusses with teachers any trends in gaps or misconceptions. Assessments are based upon a variety of sources: quizzes, tests, discussions and written/recorded reports and conclusions.

KS1

Science starts in EYFS and is taught within the Specific Area of Learning 'Understanding the World'. Children learn about: seasonal changes, changing states, everyday materials, plants, forces, lifecycles, floating and sinking and fossils. Science in KS1 is covered and introduced through activities that encourage every child to explore, problem solve, observe, predict, think, make decisions and talk about the world around them. PK is noted in curriculum documents to show links between KS1 and 2. Children learn about: seasonal changes, human changes, everyday materials, space, plants, animals and lifecycles. They are taught to ask simple questions, perform simple test, observe, identify, classify, gather and record data and use secondary sources to research.

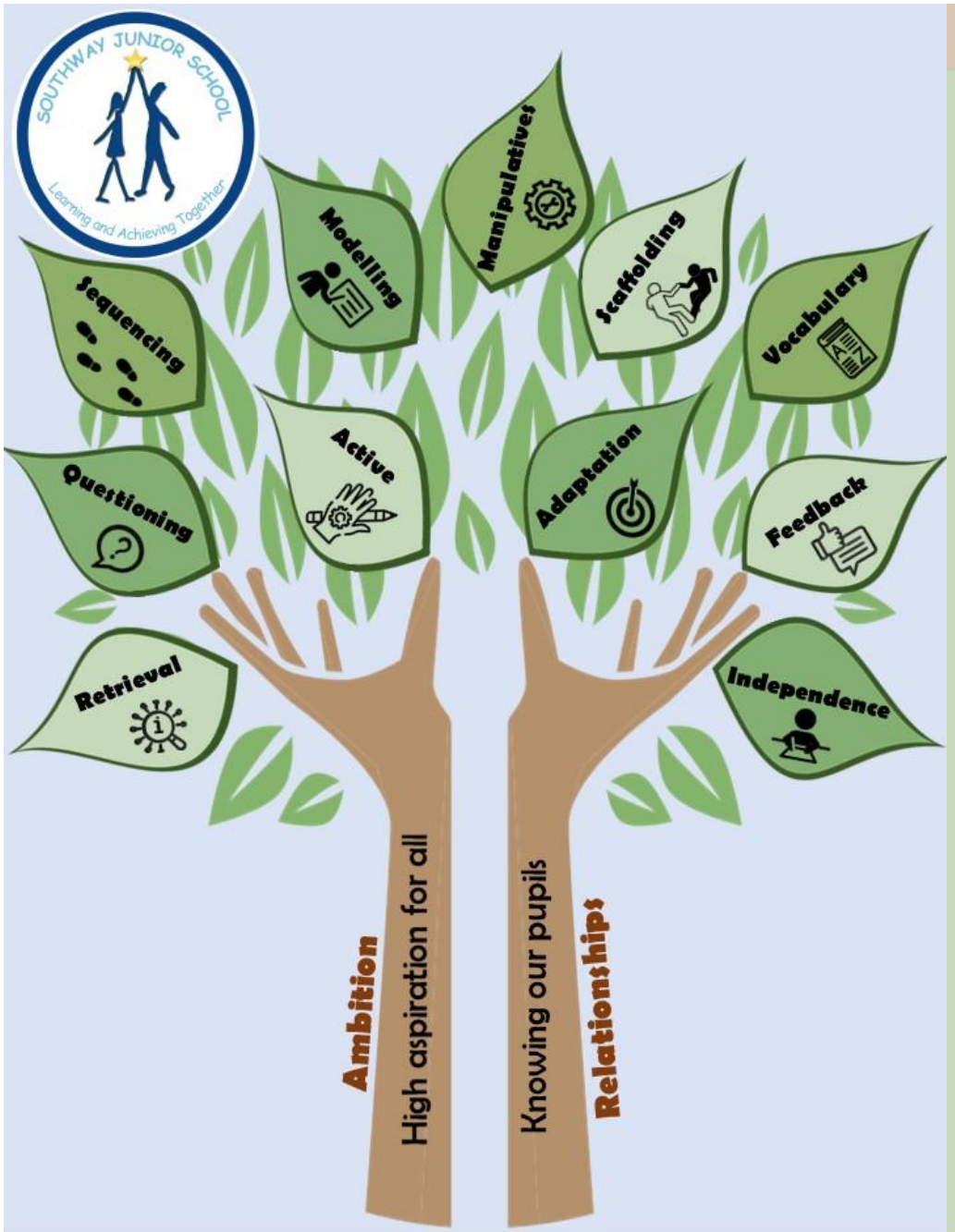
SEND

Children with SEND access the Science curriculum through quality first teaching and careful teacher assessment. Lessons are planned and resourced to enable all children to access their learning at an appropriate level, helping them to engage and be challenged. Children are supported in a variety of ways inline with the OAIP e.g. providing visual prompts alongside language including key vocabulary, using pre-teaching to support children or providing practical resources including concrete and real-life resources to support learning. For recording, alternatives to written recording are offered, for example drawing, scribing, word processing, mind maps, digital images, video and voice recording. Children with more complex SEND will access similar content to their peers but at an appropriate level.

Impact

By the end of their time at Southway, children will be able to:

- ✓ Demonstrate a love of science work and an interest in further study and work in this field.
- ✓ Retain knowledge that is pertinent to Science with a real-life context.
- ✓ Children will develop a secure understanding of each key block of knowledge.
- ✓ Be able to question ideas and reflect on knowledge.
- ✓ Be able to articulate their understanding of scientific concepts and be able to reason scientifically using extensive specialist vocabulary. Children will use technical terminology accurately and precisely.
- ✓ Apply mathematical skills through their work, organising, recording and interpreting results.
- ✓ Work collaboratively and practically to investigate and experiment.



Ambition - high aspiration for all... **Relationships** - knowing our pupils....

Sequencing Carefully planned, building on prior learning towards endpoints

Retrieval Revisiting prior learning and make connections...

- **Benefits of retrieval practice include:**
- Identify gaps in knowledge
- Make connections
- Check for understanding
- Address misconceptions
- Strengthen connections
- Get ready for new knowledge!

Modelling - Demonstrating and showing linked to learning.... When planning our lessons, it is important that we not only plan for what our pupils should do but also plan for the errors that our pupils could make **(I do, we do and you do)**

Vocabulary - Explicit teaching of new vocabulary, which can be a huge barrier to understanding, should be a fundamental part of our teaching. To ensure inclusiveness, even pre-taught to some learners so that their understanding during a lesson will be greater – use dual coding

Questioning Checking pupils' understanding

- Only ask one question at a time. Think about your question – should it be 'open' or 'closed'? Include thinking time – up to 10 seconds.
- If needed, consider clueing rather than giving the final answer.
- Build on prior knowledge by asking: "What do you already know that may be helpful?"
- Focus questions particularly on the learning objective and key vocabulary

Small Steps Chunking new and complex learning...According to cognitive load theory, because of the limits of working memory it is very difficult for young children to juggle more than around 4 items in their working memory at any one time.

Adaptation Adjusting to meet needs...

Active Pupils busy and engaged...avoid too many slides – teach some lessons without – go outside!

Hands-on Across the curriculum, resources bring lessons and learning to life, for example in maths using concrete, pictorial, and abstract manipulatives to understand mathematical concepts

Scaffolding Temporary prompts, support sentence starters, word banks task plans, writing frames/cartoon strips/ graphic organisers 'Concrete' resources, visuals, modelling examples **(I do, we do, you do)**

Independence Time given for practice to develop confidence in knowledge and skills

Feedback Giving advice and celebrating success... praise is specific and targeted
Encourage reflection and monitor progress and adapt.

Quality First Teaching

Quality First Teaching

Southway Junior School

"Learning and Achieving Together"

SCIENCE curriculum map

Year group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
3	Plants	Animals including Humans	Rocks and Soils	Rocks and Soils	Light	Light
4	Electricity	Forces and Magnets	Living Things and their Habitats	Living Things and their Habitats	Earth and Space	States of matter
5	Sound	Forces	Properties and changes of materials	Properties and changes of materials	Living things and their habitats	Living things and their habitats
6	Evolution and inheritance	Living things and their habitats	Light	Electricity	Animals, including humans	Animals, including humans

Year 3

Autumn 1	Plants		
	National Curriculum requirements: Pupils should be taught to: • Identify and describe the functions of different plants 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 form 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	**Key vocabulary:** Stem, root, leaf, flower, sunlight, carbon dioxide, oxygen, water, nutrients, seed formation, seed dispersal, pollination, germination.	**Prior Knowledge** In Year 1 and 2 children have learnt about the parts of a plant, requirements of a plant for life and the basic lifecycle of a plant (including seed dispersal and germination).
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Identify the parts of a plant.	• Label parts of a plant and their function. • Observe the parts of a plant (e.g. with a pansy).	
	2. WALT: Investigate how water is transported in plants.	• Carnation/celery water transportation experiment	Observe over time – make predictions about what will happen to the food dye. Record changes over time.
	3. WALT: Investigate the requirements of a plant to grow.	• Choose a requirement to test using a fair test. Observe over time the impact on the plants.	Fair test – could record heights of plants or a before/after sketch or photo.
	4. WALT: Order and describe the stages of the life cycle of a flowering plant.	•	
	5. WALT: Understand how plants are pollinated.	• Acting out process of pollination. • Comic strip of process of pollination.	
	6. WALT: Understand how seeds are formed.	•	
	7. WALT: Investigate how and why seeds are dispersed.	• Classify seeds based upon the features for dispersal.	Observe and classify depending upon properties for dispersal.

Autumn 2	Animals, including humans		
	National Curriculum requirements: 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 that humans and some other animals have skeletons and muscles for support, protection and movements	**Key vocabulary:** Carbohydrates, protein, fruit, vegetables, sugars, dairy, fats, movement, protection, support, hydrostatic, endoskeleton, exoskeleton, muscles	**Prior Knowledge** In KS1, children have grouped animals based on their diet and studied animals and their offspring and the basic needs that animals need to survive.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Identify the 5 main food groups and their functions.	•	
	2. WALT: Explain what makes a healthy diet.	• Investigate basic nutrition on food packaging. • Eat well plate.	
	3. WALT: Identify the function of the skeleton.	• Identify the main functions of the skeleton. • Investigate: Does a longer femur mean you jump further?	Fair test – Does a longer femur mean you jump further?
	4. WALT: Explore skeleton types.	• Identify the 3 main skeleton types and classify animals depending on their skeleton type.	Pattern seeking and classifying – classifying animal skeletons
	5. WALT: Explain how bones and muscles work together to create movement.	• Draw and label a model and describe how bones and muscles work together	
	6. WALT: Design and carry out a fair test.	• Children to choose own skeleton based investigation question (e.g. Does larger hands mean you can pick up more cubes?)	Fair test – prediction, results, conclusion.

Spring 1+2	Rocks		
	National Curriculum requirements: 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 from rocks and organic matter	**Key vocabulary:** Rock, stone, crystals, layers, hard, soft, permeable, impermeable, soil, fossil, metamorphic, igneous, sedimentary	**Prior Knowledge** In Year 1, children have experimented with different materials to investigate waterproof and absorbency.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Observe and classify rocks.	• Use magnifying glasses to observe and describe rocks in simple terms. • Group rocks based upon physical properties – learn 3 rock types.	Group rocks based upon physical properties.
	2. WALT: Test permeability.	• Record written observations when different rocks are placed into beakers of water (e.g. cloudy, bubbles).	Fair test on the permeability of different rock types. Prediction, written observations, conclusion.
	3. WALT: Test the hardness of rocks.	• Hardness test on different rocks (scratch using 3 different tools – wooden, plastic, metal). Record written observations.	Fair test on the hardness of different rock types. Prediction, written observations, conclusion.
	4. WALT: Understand fossils and how they are formed.	• Explain how fossils are formed using drama and written/drawn ideas (e.g. comic strip).	
	5. WALT: Understand how soil is formed.	• Create model of soil composition layers in a glass jar.	
	6. WALT: Investigate soil permeability.	• Soil permeability test using different soil type samples, filters, filter paper and beakers. Record written observations.	Fair test on the permeability of different soil types. Prediction, written observations, conclusion.

Summer 1+2	Light		
	National Curriculum requirements: Pupils should be taught to: • Recognise that they need light in order to see things and that dark in 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	**Key vocabulary:** Light, dark, light source, translucent, transparent, opaque, reflect, shadow	**Prior Knowledge** In Year 1, children have experimented with different materials to investigate waterproof and absorbency.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Investigate the need for light to see.	• Use of feely bag game to identify that we need light to see • Investigate different light sources – light source hunt around school?	
	2. WALT: Demonstrate an understanding of how light travels.	• Investigate using torches and pin-holed card.	
	3. WALT: Recognise that light from the sun can be dangerous and how we can protect ourselves.	• Research into the effects of sun and how to be sun safe for eyes.	Use of secondary sources to research.
	4. WALT: Observe how light travels through materials.	• Investigate whether light travels through different materials and categorise into translucent, opaque and transparent.	Identifying, grouping and classifying materials into transparent, translucent and opaque.
	5. WALT: Investigate which materials reflect light.	• Investigate which materials successfully make light and would be the best for a bookbag.	Pattern-seeking to find which materials reflect light.
	6. WALT: Make predictions about shadows.	• Make predictions about which materials will produce shadows and why.	Predicting and explaining using scientific vocabulary.
	7. WALT: Plan a fair test to investigate how shadows change.	• Investigate the effect of the distance from light source on shadow size.	Fair test – plan and prediction
	8. WALT: Carry out a fair test to investigate how shadows change.	• Investigate the effect of the distance from light source on shadow size.	Fair test – collect measurable results, conclude

Year 4

Autumn 1	Electricity		
	National Curriculum requirements: Pupils should be taught to: • Identify common appliance that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch open and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	**Key vocabulary:** Appliance, battery, circuit, components, electrical, conductor, insulator, mains power, current	**Prior Knowledge** Electricity is not taught in KS1, but some children may have looked at items which use electricity in other curriculum areas.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	8. WALT: Identify common appliance that run on electricity.	• Identify common house hold appliances that use electricity.	
	9. WALT: Investigate and construct simple circuits.	• Challenge children to create a circuit with a lit bulb and another with a buzzer. • Draw circuit diagrams of these simple circuits.	
	10. WALT: Investigate whether circuits are complete or incomplete.	• Identify whether or not a lamp will light in a simple series circuit based on it being a complete loop.	
	11. WALT: Explain how a switch works in a circuit.	• Investigate the impact of switches on bulbs. • Create circuits with working switches.	•
	12. WALT: Investigate which materials are electrical conductors or insulators.	• Test materials to decide if they are electrical insulators and conductors.	• Making observations to classify materials – predict, results, conclusions.

Autumn 2	Forces and Magnets		
	National Curriculum requirements: Pupils should be taught to: • Compare two 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	**Key vocabulary:** Force, push, pull, contact force, non-contact force, friction, magnetism, magnetic, north pole, south pole, attract, repel.	**Prior Knowledge** In Year 2, children have explored how some materials can be changed by bending, squashing, twisting and stretch. They may be able to link these movements to simple pushes and pulls.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	7. WALT: Compare how different things move.	• Investigate whether forces are push or pull. • Could look at park equipment/ playground gym equipment?	
	8. WALT: Plan and conduct a fair test to compare how objects move on different surfaces.	• Fair test to test an object (marble, toy car etc.) moving across a ramped material (do not measure the force only the time taken).	• Predict, test, conclude about an object moving across different surfaces (rough and smooth) using a fair test.
	9. WALT: Compare and group materials based on whether they are magnetic.	• Investigate and group materials based on whether they attract a magnet.	• Compare and classify objects on whether they are magnetic.
	10. WALT: Explore whether magnets attract or repel each other.	•	
	11. WALT: Record findings and draw simple conclusions from an investigation.	• Fair test to test magnetic strength by testing the number of paper clips different magnets can attract.	• Plan, predict, test and conclude the strength of magnets using a fair test on the number of paper clips different magnets can attract.

Spring 1	Living things and their habitats		
	National Curriculum requirements: Pupils should be taught to: • Recognise that living things can be grouped in a variety of was • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environments • Recognise that environments can change and that this can sometimes pose dangers to living things	**Key vocabulary:** Living, carnivore, omnivore, herbivore, vertebrate, invertebrate, classification, classification key, environment.	**Prior Knowledge** In Year 2, children have explored the differences between living and non-living things, identified that most living things live in habitats they are suited to, and understood how living things in that habitat depend on each other.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	7. WALT: Explain how to distinguish between living and non-living objects.	• Explore what makes things living (MRS NERG) and distinguish between living and non-living.	
	8. WALT: Recognise that living things can be grouped in various ways.	• Group animals using the 5 main animal kingdoms; invertebrate and vertebrate; carnivore, herbivore and omnivore.	Classify animals based upon different criteria.
	9. WALT: Explore and use classification keys to name living things in my local environment.	• Use classification keys to identify living things (e.g. mini beasts, leaves) in local environment.	Classify living things based upon different criteria.
	10. WALT: Create criteria to identify, group and classify a range of living things.	• Create own classification keys to identify different living things.	Classify living things upon different criteria.
	11. WALT: Research into the possible environmental changes and dangers.	• Research into the effects of human actions on the environment (e.g. pollution, deforestation, recycling)	Secondary research using iPads and books.

Spring 2	Animals, including humans		
	National Curriculum requirements: Pupils should be taught to: • Describe the simple functions of the basic parts of the digestive system in humans • Identify they different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	**Key vocabulary:** Molar, canine, incisor, function, saliva, oesophagus, peristalsis, stomach, small intestine, large intestine, anus, food chain, predator, prey, producer, consumer	**Prior Knowledge** In Year 3 children have learnt about healthy diets and nutrition. In KS1 children have identified common animals that are carnivore, omnivore and herbivore. They have also learnt that most living thing live in habitats and they can construct simple food chains.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	9. WALT: Identify the different types of teeth and their functions.	• Use a mirror to notice shapes of teeth and predict what functions are. • Eat a carrot to see function of teeth. • Label teeth and functions.	
	10. WALT: Observe over time the effect of different liquid on teeth.	• Disclosure tablet and teeth brushing. • Egg experiment set up to see impact of different liquids on teeth.	Observing over time the impact of different liquids on teeth (eggs). Make predictions and set up.
	11. WALT: Draw conclusions from an observation.	• Draw results and conclusions of egg experiment.	Observing over time the impact of different liquids on teeth (eggs). Make observations and conclusions.
	12. WALT: Explain the functions of the digestive system.	• Model the digestive system using a piece of chocolate cake. Take pictures to record in books.	
	13. WALT: Explain the functions of the digestive system.	• Write up the process of food travelling through the digestive system using scientific vocabulary.	
	14. WALT: Interpret food chains.	• Explore and draw food chains for living things.	

Summer 1	Earth and Space		
	National Curriculum requirements: 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 and night and the apparent movement of the sun across the sky	**Key vocabulary:** Orbit, axis, day, month, planet, solar system, year, gravity	**Prior Knowledge** In KS1 children have observed changes across the seasons and weather changes. They have learnt that the sun is a light source in year 3 and observed shadows changing as the sun moves in the sky.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Develop an understanding of the solar system.	• Research a planet and share findings as a class.	Secondary research
	2. WALT: Demonstrate an understanding of the relative sizes and shape of the Earth, Sun and Moon.	• Investigate using different sized objects to represent the Earth, Sun and Moon. • Research into the ideas about the Earth, Sun and Moon being spherical bodies.	
	3. WALT: Demonstrate an understanding of the relative distances of the Sun, Earth and Moon.	• Investigate the relative distances outside.	
	4. WALT: Understand the moon's orbit around the Earth	•	
	5. WALT: Understand why day and night happens.	•	

Summer 2	States of Matter		
	National Curriculum requirements: 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	**Key vocabulary:** Solid, liquid, gas, change, evaporation, condensation, precipitation, freeze, heat, temperature	**Prior Knowledge** In KS1 children have compared and group materials based on their simple properties and explored how to change materials shape by bending, twisting, squashing and stretching.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Identify solids, liquids and gases.	• Group solids, liquids and gases. • Describe the characteristics of matter including how the particles are organised.	
	2. WALT: Investigate how heating and cooling can change a material's state.	• Explore melting points of chocolate using different temperature water baths to time how long a piece of chocolate takes to melt.	Fair test – predict, collect results, conclude.
	3. WALT: Investigate how water can change its state to a solid, liquid or gas	• Explore water changing shape using the model of ice cubes on clingfilm spread over a bowl of water.	
	4. WALT: Identify the part played by evaporation and condensation in the water cycle.	•	
	5. WALT: Explore whether the rate of evaporation is associated with temperature.	• Pour equal amounts of water on materials and place in different areas (with different temperatures), observe over time and see which evaporates quickest.	Fair test – predict, collect results, conclude.

Year 5

Autumn 1	Sound		
	National Curriculum requirements: 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 produce it • Find patterns between the volume of a sound and the strength of the vibrations that produce it • Recognise that sounds get fainter as the distance from the sound source increases	**Key vocabulary:** Vibration, pitch, sound wave, frequency, high, low, soft, loud, tuning, noise, volume, sound, amplitude	**Prior Knowledge** Children have not learnt about sound directly in previous Science lessons but may have knowledge of pitch and volume from music lessons.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Explore and explain how sounds are made.	• Place rice on a drum/tuning fork in water to see vibrations caused by sound. • Investigate how different instruments produce sound.	Observe how different instruments produce sound.
	2. WALT: Explain and summarise how different sounds travel.	• Explore how different models demonstrate sound moving through a medium and into the ear (e.g. slinky, clapping on field). • Investigate string telephones over distance and the effect of distance on volume	
	3. WALT: Explore and explain why sounds have different volume and pitch.	• Explore how to change pitch with various models (e.g. water in cups, panpipes, boomwackers).	
	4. WALT: Investigate ways to absorb sound.	• Investigate the best materials to absorb sound and sound proof a room.	Complete a fair test to investigate the best materials to absorb sound. (data logger?)

Autumn 2	Forces		
	National Curriculum requirements: Pupils should be taught to: • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between 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	**Key vocabulary:** Force, gravity, water resistance, air resistance, friction, mechanisms, levers, pulleys, gears	**Prior Knowledge** In Year 4, children have explored simple pull and push forces. They have looked at how the texture of an object or surface can affect the way the object moves and hove also investigated with pull (repel) and pull (attract) forces with magnets.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Hypothesis and justify how gravity works.	• Create own experiment to test hypothesis about gravity.	Complete a fair test about gravity.
	2. WALT: Complete a fair test to investigate air resistance.	• Fair test looking at the factors affecting the time for a paper spinner to drop.	Create a hypothesis question to test about air resistance. Plan a fair test. Make a prediction. Carry out a fair test. Draw conclusions from a fair test.
	3. WALT: Apply understanding about water resistance.	• Fair test looking at the effect of water resistance on different plasticine shapes.	Plan, predict, carry out and conclude within a fair test.
	4. WALT: Evaluate whether different surfaces affect friction.	• Fait test on friction – shoe experiment. Drag shoe/toy over different surfaces to see how to affects the amount of friction.	Complete a fair test to test friction on different surfaces.
	5. WALT: Explore and design mechanisms.	• Explore levers, pulleys and gears to allow a small force a greater effect.	Make observations about the effect of different mechanisms.
	6. WALT: Apply knowledge about forces using diagrams.	• Observe and identify different forces acting on objects. • Complete force diagrams to show these forces.	Observe forces acting on objects.

Spring 1 + 2	Properties and Change of Materials		
	National Curriculum 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 in not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	**Key vocabulary:** Solid, liquid, gases, boiling, freezing, evaporating, condensing, magnetism, conductivity, transparency, permeability, hardness, insulate, soluble, insoluble, saturation, solution, filtration, chemical change, physical change, reversible change, irreversible change	**Prior Knowledge** In Year 4, children have learnt to compare and group materials based on whether they are solids, liquids or gases. They have observed that some materials change state when heated or cooled and measured/researches the temperature at which this happens.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Investigate solids, liquids and gases and their properties.	• Recap knowledge of solids, liquids and gases and the process of changing states between them.	
	2. WALT: Classify materials based on their properties.	• Exploring hardness, permeability, magnetism, conductivity and transparency on a variety of materials. • Classify these materials based on findings.	
	3. WALT: Apply knowledge of materials to insulate a cold drink.	• Fair test to investigate and measure which material best insulates a cold drink.	Fair test – predict, collect results and conclude findings (use scientific reasons to explain why)
	4. WALT: Reach informed conclusions about soluble and insoluble.	• Investigate soluble and insoluble materials. • Investigate how to recover a substance from a solution (evaporation).	

	5. WALT: Make reasoned judgements about how to separate mixtures.	• Investigate separating mixtures through sieving, filtering and evaporating.	
	6. WALT: Summarise reversable and irreversible changes.	• Explore dissolving, mixing and changes of states as reversable changes. • Explore burning and the action of acid on bicarbonate of soda as irreversible changes.	

Summer 1 + 2	Living Things and Their Habitats		
	National Curriculum requirements: 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 process of reproduction in some plants and animals	**Key vocabulary:** Fertilisation, pollination, pollen, stamen, pistil, seed dispersal, reproduction, sexual, asexual.	**Prior Knowledge** In Year 3 children have explored the lifecycle of flowering plants including germination, pollination, seed formation and seed dispersal.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Explain the lifecycle of a flowering plant.	• Explore the main parts of the life cycle of a plant. • Explore the parts of a plant – including the reproductive parts.	
	2. WALT: Reach an informed conclusion about how some plants reproduce.	• Explore the parts of a plant – including the reproductive parts. • Investigate sexual reproduction in plants – pollination.	
	3. WALT: Reach an informed conclusion about how some plants reproduce.	• Investigate asexual reproduction in plants using geraniums.	
	4. WALT: Compare mammal life cycles.	• Research into the life cycle of different mammals.	
	5. WALT: Apply knowledge about the life cycles of amphibians and insects.	• Research into the life cycles of amphibians and insects. • Butterfly life cycle experiment.	
	6. WALT: Compare the life cycles of birds with other species.	• Research into the life cycles of birds. • Explore eggs.	
	7. WALT: Compare the life cycles of mammals, amphibians, insects and birds.	• Create a documentary explaining and comparing the life cycles of at least 2 types of animals.	

Year 6

Autumn 1	Evolution and inheritance		
	National Curriculum requirements: 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	**Key vocabulary:** Inheritance, parent, offspring, adaptation, environment, habitat, evolution, Charles Darwin, fossils.	**Prior Knowledge** In Year 3, children have learnt about the formation of fossils (Rocks and Soils topic).
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Demonstrate an understanding of inheritance.	• Model inheriting characteristics from parents to offspring using Mr Men/Little Miss characters.	
	2. WALT: Demonstrate an understanding of how animals adapt to their environment.	• Look in to detail of camel and polar bear adaptations for their environments.	
	3. WALT: Hypothesis about why Galapagos finches have a diverse variety of beaks.	• Beak and different food types experiment.	Fair test – predict, record results, conclude findings.
	4. WALT: Examine theories of evolution and the evidence of evolution.	• Explore theories of evolution. • Explore how fossils show us evolution over time.	
	5. WALT: Apply knowledge of adaptation to create and animal specialised to survive in its habitat.	• Create an animal specialised to survive in its habitat.	
	6. WALT: Apply knowledge of adaptation to create and animal specialised to survive in its habitat.	• Create an animal specialised to survive in its habitat.	

Autumn 2	Living things and their habitats		
	National Curriculum requirements: 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-organism, plants and animals • Give reasons for classifying plants and animals based on specific characteristics	**Key vocabulary:** Rock, stone, crystals, layers, hard, soft, permeable, impermeable, soil, fossil, metamorphic, igneous, sedimentary	**Prior Knowledge** In Year 4, children will have consolidate understanding about habitats and learnt how to use a basic classification key.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	7. WALT: Describe how animals can be classified into broad groups.	• Classify different animals in lots of different ways. • Choose one way to classify animals and write into books.	Group animals based upon a variety of different criteria.
	8. WALT: Understand how to use classification keys.	• Create own classification keys to classify animals using groupings from previous lesson.	
	9. WALT: Describe how plants can be classified into broad groups.		
	10. WALT: Understand that microorganisms are also living things.		
	11. WALT: Describe how microorganisms can be classified into broad groups.		
	12. WALT: Explore different ways to classify different living things.		

Spring 1	Light		
	National Curriculum requirements: 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	**Key vocabulary:** Light, dark, reflect, shadow, opaque, translucent, transparent, luminous, scattering, absorption, refraction	**Prior Knowledge** In Year 3, children have learnt that light can be reflected from surfaces. They have explored why shadows are formed and how the size of shadows can be changed.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Reach reasoned judgements about light.	Investigate the following questions: • Does light travel in straight or curved lines? • What causes a shadow to form.	Observe the effect of different objects on how light travels.
	2. WALT: Reach reasoned judgements about light.	Investigate the following questions: • Is light made up of colour? • Does light come from our eyes or reflect off objects into our eyes?	Observe the effect of different objects on how light travels to the eye.
	3. WALT: Explain how we see.	• Explore how we see through the absence of light. • Use diagrams to show how we see objects. • Label the key parts of the eye.	

Spring 2	Electricity		
	National Curriculum requirements: 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	**Key vocabulary:** Battery, circuit, components, conductor, electrical, insulator, volts	**Prior Knowledge** In Year 4, children have created simple series circuits and identified whether different components will function depending on being part of a loop and the impact of a switch.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Explore electrical circuits.	• Explore circuits involving buzzers, bulbs and switches and the impact on these. • Represent simple circuits using circuit diagrams.	
	2. WALT: Investigate using switches in circuits.	• Children investigate how the position of a switch impacts other components in a circuit. • Children investigate how to use switches to turn on/off one component at a time.	
	3. WALT: Investigate how to change the brightness of a lamp.	• Complete a fair test to investigate how to change the brightness of a bulb.	• Fair test – plan, predict, results, conclusion
	4. WALT: Plan a fair test to investigate variations in how components function.	• Plan a fair test to investigate variation in components (e.g. do more buzzers make them quieter? Do more wires make a bulb dimmer?)	• Fair test – plan (post-it-note planning), predict, complete.
	5. WALT: Write a reasoned conclusion.	• Write a conclusion based upon last lesson's results. Share conclusions from different investigations.	• Fair test – conclude, share results

Summer 1 + 2	Animals including humans		
	National Curriculum requirements: 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 lifestyles on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans	**Key vocabulary:** Heart, lungs, blood, blood vessels, views, arteries, heart rate	**Prior Knowledge** In Year 3, children have studied the skeletal system of animals and humans. In Year 4, children have explored the digestive system.
	WALTs and Suggested Outcomes		**Working Scientifically Opportunities**
	1. WALT: Explore the form and functions of the human body.	• Recap the main organs of the human body and their function.	
	2. WALT: Identify the main parts of and functions of the human circulatory system.	• Act out the functions of the human circulatory system.	
	3. WALT: Explore the parts and functions of the heart.	• Observe the different parts of the heart and explore their function – use a pig's heart to dissect.	• Observing parts of the heart using dissection.
	4. WALT: Explore the function of the blood and blood vessels.	• Research into the function of blood and blood vessels to transport water and nutrients round the body.	• Secondary research on the function of the blood and blood vessels.
	5. WALT: Investigate what happens to pulse rate when we exercise.	• Investigation looking at the impact of exercise on pulse rate. • Draw line graphs to display results.	• Observing over time the impact of exercise on heart rate. • Presenting data in a line graph.
	6. WALT: Investigate how to lead a healthy lifestyle.	• Research the impacts of exercise and diet on lifestyle.	
	7. WALT: Investigate the impacts of an unhealthy lifestyle.	• Research the impacts of drugs and alcohol on lifestyle.	