

Science Progression of Knowledge

Our science curriculum provides pupils with an understanding of both substantive and disciplinary knowledge.

Substantive knowledge- is the subject knowledge and explicit vocabulary used to learn about the content

Disciplinary knowledge– this considers how scientific knowledge originates and is revised. It is through disciplinary knowledge that children gradually become more expert by thinking like a scientist.

Substantive Knowledge: Concepts, models, laws and theories

Biology

- Living things and their environment (Animals, humans, plants, habitats)
- Reproduction, inheritance and evolution (Evolution, inheritance, life processes, life cycles)

Chemistry

- States of matter (Solids, liquids, gases)
- Materials (properties and changes including reversible/irreversible changes)
- Rocks and fossils

Physics

- Energy (Light, sound, electricity)
- Forces (Friction, air resistance, gravity, magnets)
- Earth and space (Seasons, day and night, solar system and beyond)

Science in EYFS

All areas of learning and development at the Foundation Stage are inter-connected. Through engaging in science activities, children not only learn about the world around them but develop disciplinary skills in all areas.

Characteristics of Effective Learning

The ways in which a child engages with other people and their environment - playing and exploring, active learning, and creating and thinking critically – underpin learning and development across all areas and support the child to remain an effective and motivated learner.

‘Understanding the World’

This is a specific area of the Early Years Curriculum that includes essential skills and knowledge about the world and provides firm foundations on which children can build their scientific understanding. Early Years children will be actively involved in play and exploration and be encouraged to be creative. They will be supported to think critically and ask questions, which will help them to make sense of their world through well-planned play opportunities.

ELGs:

- 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
- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
- Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions.
- Make comments about what they have heard and ask questions to clarify their understanding.

End points:

By the end of EYFS, children can identify similarities and differences between themselves and others, places, objects, materials and living things. They can make simple observations of animals and plants. They recognise that technology is used for particular purposes in different environments and can select technology appropriately. They can explore how to make things move.

By the end of KS1, the basic fundamentals of the biology strand have been established. Pupils explore animals, humans and changes within environments and begin to develop simple scientific vocabulary linked to this. Children use different types of scientific enquiry to answer a range of questions. Children are encouraged to ask questions, discuss their findings and present the ideas in a variety of ways.

By the end of KS2, pupils have a deep understanding of a range of scientific ideas. Children are able to link scientific ideas to the world around them and, through research, understand how scientific ideas are developed over time. Children use secondary sources of information and practical enquiry to draw conclusions and find things out.

1. Pupils have an understanding of the key domains of knowledge and can use key concepts to make links between the domains
2. Pupils can ask questions and make observations about the world around them using scientific knowledge
3. Pupils can analyse data and articulate evidenced conclusions
4. Pupils are able to follow and design scientific enquiries
5. Pupils have an understanding of some of the major issues facing our planet and an appreciation of the importance of science to wider society

Substantive knowledge

Biology

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	- Describe and comment on things they have seen whilst outside, including plants and animals. - Know how to make a simple record of their observations of the natural world, including animals and plants - Know how to discuss how we care for the natural world around us. - Notice changes in the leaves, weather and seasons.	- Know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees - Know, identify and describe the basic structure of a variety of common flowering plants, including trees	- Plants can grow from seed or bulbs. Seeds and bulbs germinate and grow into seedlings. Seedlings grow into mature plants - Plants need light, water, space, suitable temperature in order to grow	- Know and identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - Know what plants need for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - Know how water is transported within plants		- Know that reproduction is when a plant produces one or more individuals similar to itself. - Explain that sexual reproduction requires both male and female DNA (sex cells) and will produce offspring that are similar, but not identical to the parents. - Explain that asexual reproduction will produce offspring that is identical to the parent and only requires one parent e.g. bulbs, tubers and runners. - Use prior knowledge of parts of a flower to explain the stages involved in the reproduction process (pollination, fertilisation and germination)	
Progression in vocabulary		Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem	Seeds, Bulbs, Water, Light, Temperature, Growth	Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower		Asexual reproduction, bulb, cutting, fertilise, life cycle, metamorphosis, reproduction,	

						runner, sexual reproduction, tuber	
Living things and their habitats	• Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things		• Identify the differences between things that are living, dead, and things that have never been alive, using some of the 7 life processes. • Identify that most living things live in habitats to which they are suited • Name a variety of plants and animals in their habitats, including micro-habitats. • Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Know and explain 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		• Know the 7 life processes of living organisms and use them to determine if an organism is living. • Describe similarities and differences between examples of plants and animals. • Group living things in a variety of ways using key characteristics. • Use classification keys to help group and identify a variety of living things in their local and wider environment. • Recognise that environments can change, and this can sometimes pose dangers to living things. • Understand that human actions can impact on the environment and suggest some solutions to the issues	• Know that reproduction is when an animal or plant produces one or more individuals similar to itself • Explain that sexual reproduction requires both male and female DNA (sex cells) and will produce offspring that are similar, but not identical to the parents. • Explain that asexual reproduction will produce offspring that is identical to the parent and only requires one parent e.g. bulbs, tubers and runners. • Explain and describe the life cycle of a mammal, amphibian, insect and a bird noting the differences. • Explain the process of metamorphosis using frogs and butterflies as examples.	Know that living things can be grouped according to different criteria. • Know that a cell is made up of nucleus, cytoplasm and membrane. • Know that living things can be multicellular or unicellular (bacteria).
Progression in vocabulary			Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert, Urban		Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects,	Mammal, Reproduction, Insect, Amphibian, Bird, Offspring	Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects

					Environment, Habitats		
Animals, including humans	• Make healthy choices about food, drink, activity and toothbrushing. • Begin to make sense of their own life-story and how they have grown and changed. • Understand the key features of the life cycle of a plant and an animal. • Know and talk about the different factors that support their overall health and wellbeing • Describe and comment on things they have seen whilst outside, including plants and animals. • Know how to record their observations of the natural world, • Recognise some environments that are different to the one in which they live. • Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices	• 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) • Know, 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	• 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 movement	Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	• Describe the changes as humans develop to old age • Describe the key stages in the growth and development of humans. • Recall some of the changes experienced in puberty. • Investigate the gestation periods of other animals in comparison to humans.	Circulation • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans
Progression in vocabulary		Fish, Reptiles, Mammals, Birds, Amphibians (+	Survival, Water, Air, Food, Adult, Baby, Offspring, Exercise,	Movement, Muscles, Bones, Skull, Nutrition, Skeletons	Mouth, Tongue, Teeth, Oesophagus, Stomach, Small	Foetus, Embryo, Womb, Gestation, Prenatal, Infancy,	Circulatory, Heart, Blood Vessels, Veins, Arteries,

		examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak	Hygiene, Balanced Diet		Intestine, Large Intestine, Canine, Incisor, Molar, Carnivore, Herbivore, Predator, Prey	Childhood, adolescence, Early adulthood, Middle adulthood, Late adulthood/ Elderly, Growth, Development, Puberty	Oxygenated, Deoxygenated, Valve, Exercise, Respiration
Evolution and inheritance							• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Progression in vocabulary							Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics

Chemistry

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Talk about the differences between materials and changes they notice. • Understand some important processes and changes in the Natural world around them, including the seasons and changing states of matter.	Everyday materials: • Know the difference between objects from the material from which it is made • Know, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Know and describe the simple physical properties of a variety of everyday materials: hard/soft, flexible/rigid, waterproof/absorbent. • Group together a variety of everyday materials on the basis of their simple physical properties. • Know the similarities and differences between some everyday materials.	Uses of everyday materials: • Identify what properties a material needs for a particular purpose. • Name the materials from which different objects are made. • Recognise suitable and unsuitable choices of materials for particular purposes based on physical properties • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Know that materials can be either man-made or naturally occurring. • Group objects into man-made or natural categories. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Rocks: • Name and describe 3 different kinds of rocks. • Group and compare different kinds of rocks on the basis of appearance and simple physical properties. • Describe how each rock type is formed within the rock cycle. • Understand different uses for selected rocks and how they change over time. • Explain simply how a fossil is formed. • Recognise that soils are made from rocks and organic matter, (living and dead) and be introduced to different soil types.	States of Matter: • Know that all things are made up of particles which are arranged differently in solids, liquids and gases. • Name the properties of solids, liquids and gases. • Compare and group materials according to if they are solids, liquids and gases, giving reasons to justify their choices. • Observe that some materials change state when heated or cooled, and give everyday examples of melting and freezing. • Understand that melting and freezing are a state change between solids and liquids. • Measure or research the temperature at which melting and freezing occurs for some materials. • Know that water freezes at 0oc and boils at 100oc. • Understand that condensation is a state change from a gas to a liquid.	Properties and changes of materials: • 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. • Discuss the suitability of everyday materials for different purposes based on their properties, giving reasons, based on evidence from comparative and fair tests • Know the difference between reversible and irreversible changes. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes results in the formation of new materials, and that this kind of change	

					• Understand that evaporation is a state change from liquid to gas. • Understand that boiling and evaporation are the same state change from liquid to gas but at different temperatures. • Know that the speed of evaporation depends on a number of variables including the temperature. • Describe the water cycle. • Identify the parts played by evaporation and condensation in the water cycle.	is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. • Understand some materials will dissolve in liquid to form a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating. • Describe how to recover a substance from a solution.	
Progression in vocabulary		Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth	Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent, Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil	Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent	Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating	Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing	

Physics

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces and magnets	• Explore how things work • Explore and talk about different forces they can feel			• Compare how things move on different surfaces • Notice that some forces need contact between two		• Know the work of Isaac Newton and know that force is measured in Newtons by a Newton Meter	

	• Talk about the differences between materials and changes they notice • Explore the natural world around them Describe what they see, hear, and feel whilst outside.			objects, but magnetic forces can act at a distance • Describe magnets as having two poles • Observe how magnets attract or repel each other and attract some materials and not others • Predict whether two magnets will attract and repel each other, depending on which poles are facing • 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		• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance • Identify the effects of water resistance • Identify the effects of friction acting between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater affect	
Progression of vocabulary				Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull		Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulley	
Light				• Recognise that they need light in order to see things and that dark is the absence of light • Notice that light is reflected from surfaces • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes			• Recognise that 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

				• Recognise that shadows are formed when the light from a light source is blocked by an opaque object			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
Progression in vocabulary				Light, Shadows, Mirror, Reflective, Dark, Reflection			Refraction, Reflection, Light, Spectrum, Rainbow, Colour
Sound					• Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases		
Progression in vocabulary					Volume, Vibration, Wave, Pitch, Tone, Speaker		
Electricity					• Electricity is a form of energy, used for lighting, heating, making sound and		• Recognise circuit symbols in a simple circuit- identify the simple circuit used in a hand torch

					making machines and appliances work. • Some appliances run on electricity; some plug into the mains electricity and others run on batteries. • An electrical circuit consists of a cell or battery connected to a component using wires. • A series circuit is where all the components of the circuits are joined in one loop. If one part of the loop is incomplete, then the circuit will not work • Names of components include cells, wires, bulbs/ lamps, switches and buzzers • A cell is a single unit, and a battery is a collection of cells • Know how to test a circuit using a bulb. • Switches open and close circuits. When a switch is open the bulb/lamp will not light up as the series circuit is incomplete. • Wires are made from metals as they are good conductors of electricity		• Electric current is measured in amperes, current is a flow of charge • Associate the brightness of a lamp or volume of a buzzer with the potential difference in a circuit • Investigate the brightness of a bulb if the PD is increased or the number of bulbs increased in a series circuit • Investigate how the length of wire affects the brightness of a bulb. • Potential difference is measured in volts • Resistance, measured in ohms, as the ratio of potential difference (P.D.) to current • Differences in resistance between conducting and insulating components(quantitative) • Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects • The idea of electric field, forces acting across the space between objects not in contact
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					e.g. iron, copper and steel • Insulators are materials that do not allow electricity to pass through them easily e.g., plastic, wood, rubber and glass. • Thomas Edison invented the first practical incandescent light bulb		
Progression in vocabulary					Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators		Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell
Earth and Space	• Learn about the solar system and stars • Learn about space travel • Explore the natural world around them • Describe what they see, hear and feel whilst outside • Name the 4 seasons and say when in the year they occur • Observe and describe weather associated with the seasons • Observe changes across the 4 seasons • Describe some other features that change throughout the year that are • Understand the effect of change in	Seasonal changes: • Name the 4 seasons and say when in the year they occur • Observe and describe weather associated with the seasons • Observe changes across the 4 seasons • Describe some other features that change throughout the year that are caused by the change in weather e.g. numbers of mini beasts found outside, seed and plant growth, leaves on trees, clothes worn by people, • Explain how day light (from the sun rising to sun setting) length varies across				Earth and Space: • Name the planets of Our Solar System and understand Our place in Our universe, describe the Sun, Earth, Moon and other planets as approximately spherical bodies • Describe the movement of the Earth around the sun in the solar system (a full orbit is 365 days, the Earth spins on its axis every 24 hours) • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the day • Describe the movement of the	

	seasons on the natural world around them • Name the 4 seasons	the year (longer in summer, shorter in winter)				moon relative to the Earth (lunar cycles take 28 days, the lunar cycle and eclipses) • Describe the movement of the other planets relative to the sun in the solar system (fixed orbits) • Describe what meteors are, and name other objects in space • Explain how 'The Space Race' has expanded our scientific knowledge and discuss space travel	
Progression in vocabulary		Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark				Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, Star, Constellation	

Disciplinary knowledge: Working scientifically

Disciplinary knowledge is taught and embedded within the teaching of each unit of substantive knowledge.

- Methods used to answer questions (use of models, classification, correlations and patterns, experimentation, fair testing)
- Using apparatus and techniques (accurate measurement, collecting and recording data, carrying out procedures safely and accurately)
- Data analysis (processing and presenting data, exploring relationships, communicating results in tables / graphs, identifying correlations)
- Using evidence to develop explanations (using evidence / scientific knowledge to draw conclusions, explain laws, models, concepts and findings)

As part of working scientifically which is embedded throughout all units, pupils will also learn to use a variety of enquiry strategies to answer scientific questions. Different questions lead to different types of enquiry and are not limited to fair testing. By the end of primary school, children will be able to use these enquiry strategies confidently and know that different strategies may be needed at different times.

- Observing over time: (observing or measuring how one variable changes over time)
- Identifying and classifying: (identifying and naming materials/living things and making observations or carrying out tests to organise them into groups)
- Looking for patterns: (making observations or carrying out surveys of variables that cannot be easily controlled and looking for relationships between two sets of data)
- Comparative and fair testing: (observing or measuring the effect of changing one variable when controlling others)
- Answering questions using secondary sources of evidence: (answering questions using data or information that they have not collected first hand)

Disciplinary skills progression to develop Working Scientifically skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking questions	Looking at objects and pictures and discussing what they can see. Asks questions about aspects of their familiar world. Generating a variety of ideas for testing (not always realistic/ appropriate).	To be able to ask simple questions (modelled by teacher). To begin to read and spell scientific vocabulary when asking and answering questions.	To be able to ask simple questions and recognise that they can be answered in different way. To read and spell scientific vocabulary when asking and answering questions.	To be able to make decisions, asking relevant questions. To use scientific vocabulary when asking and answering questions.	To be able to make decisions, asking relevant questions and using different types of scientific enquiries to answer them. To use scientific vocabulary correctly when asking and answering questions.	To be able to plan different types of scientific enquiries to answer questions. To recognise and control variables where necessary. To be able to explore and talk about their ideas. To be able to analyse functions,	To be able to plan independently different types of scientific enquiries to answer questions. To independently recognise and control variables where necessary. To be able to explore and talk about their ideas using

						relationships and interactions.	scientific vocabulary. To ask their own questions about scientific phenomena. To be able to analyse functions, relationships and interactions systematically.
Observing	General sensory observations of animals and plants. Simple descriptions of the world around them.	To observe changes over time and be able to notice patterns in their observations. To understand that we can use observations to help with answering questions. To use simple equipment when observing: magnifying glasses, egg timers, sand timers.	To observe closely changes over time using simple equipment to measure. To recognise patterns and explain their thinking. To perform simple tests and record results from their observations, e.g. Changes over time caterpillar to butterfly.	To set up simple practical enquiries, and begin to understand comparative and fair tests. To work in groups or teacher to model how to make systematic and careful observations using notes and simple tables. To begin to look for naturally occurring patterns and relationships.	To set up simple practical enquiries, comparative and fair tests. To make systematic and careful observations using notes and simple tables. To identify differences, patterns, similarities or changes related to simple scientific ideas and processes.	To begin to identify patterns that might be found in the natural environment. To begin to make decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them. Begin to interpret data and find patterns.	To identify patterns that might be found in the natural environment. To make independently decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them. To choose the most appropriate equipment and explain how to use it accurately. To interpret data and find patterns. To be able to make a set of observations and say what the interval and range are.
Explaining	To know how to comment on what is happening in the world around me using simple learnt scientific facts.	To know how to orally recall some scientific facts to explain observations. To know how to match a label to a picture.	To know how to select scientific facts to explain my findings or match given labels to the correct part of a diagram.	To know how to use facts, scientific research or vocabulary from a word bank to explain a given diagram.	To know how to use facts, scientific research or independently label a drawn diagram to explain scientific processes or theories.	To know how to use facts or scientific research from different viewpoints to explain similarities and differences in drawn diagrams, scientific processes or theories.	To know how to use facts, scientific research or scientific knowledge and understanding to compare and evaluate scientific diagrams, processes or theories to present a logical argument.
Classifying	To know how to name simple things relating to science and group them	To know how to classify by identifying similarities,	To know how to create my own criteria for classifying by	To know how to compare appearance and properties using	To know how to design, construct and use a simple	To know how to use a sub-group when creating my own	To know how to use multiple sub-groups when creating my

	based on visual differences.	differences, properties or characteristics.	identifying changes over time or describing appearance and properties.	scientific information and use this to construct a simple classification key.	classification key to identify.	criteria for classifying.	own criteria for classifying.
Predicting	To know how to comment on what might happen next.	To be able to make a suitable prediction about what might happen.	To form predictions about what they think the outcomes of an investigation will be, using my experiences to explain what might happen next.	To know how to predict cause and effect (causal prediction).	To know how to predict a trend (relationship prediction).	To know how to use knowledge and understanding to generate and explain a testable hypothesis.	To know how to generate a testable hypothesis and consider variables when making predictions.
Investigating	To know what we are investigating.	To know there are different ways to start an investigation.	To know what and how we might investigate.	To know how to explain what the independent variable is and how we might investigate it in a given experiment.	To know how to explain what the independent and control variables are and how we might investigate in a given experiment.	To know how to explain what the independent, dependent and control variables are and how we might investigate in a given experiment.	To know how to design and conduct fair and comparative tests, which consider independent, dependent and control variables.
Measuring and recording	To measure by direct comparison. To use non-standard units of measurement. To use simple comparative language e.g. smaller/bigger. To record ideas simply e.g. pictures/images.	To know there are different ways to record changes over time. To explore how to measure and record: whole class charts: bar graphs using multi-link cubes, survey, tables. To begin to understand how science can be used to explain what is occurring. To sort and group in different topics: animals, plants.	To use measuring equipment and record their findings on a chart or simple scale. To use simple scientific equipment including magnifying glasses when measuring and recording. To be able to gather and record data and present it in different ways including on charts, tables and simple graphs. To sort and group in different ways e.g. materials.	To take accurate measurements using standard units, using a range of equipment. To gather, record, classify and present data to help in answering questions. To record findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.	To take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. To gather, record, classify and present data in a variety of ways to help in answering questions. To record findings using scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	To be able to take measurements, using a range of scientific equipment. To take measurements with increasing accuracy. To understand why it might be important to take repeat readings when appropriate. To be able to record data and results using scientific diagrams and labels. To show results using classification keys, tables, bar and line graphs	To be able to take measurements independently, using a range of scientific equipment. To take measurements with increasing accuracy and precision. To take repeat readings when appropriate and begin to account for anomalies. To be able to record data and results of increasing complexity using scientific diagrams and labels. To show results using classification keys, tables, scatter graphs, bar and line graphs.
Concluding	To simply talk about objects and events.	To know that there are various ways to find answers	To use simple scientific language when recording their	To use results to draw simple conclusions, make	To report on findings from enquiries, using relevant	To report and present findings and make conclusions	To draw conclusions based on data and observations. To use

		(modelled by the teacher). To begin to use recording and observations to answer questions (modelled by teacher).	findings. To be able to present and analyse their findings using more sophisticated scientific vocabulary To use their observations and ideas to suggest answers to questions	predictions for new values, suggest improvements and raise further questions. To use straightforward scientific evidence to answer questions or to support their findings.	scientific language, including oral and written explanations, displays or presentations of results and conclusions. To use scientific evidence to answer questions and to support their findings.	from enquiries. To use evidence to justify ideas. To use scientific knowledge and understanding to explain findings.	scientific knowledge and understanding to explain findings. To identify causal relationships and explanations To recognise 'degree of trust' in result, in oral and written forms.
Evaluating	To begin to say what went well when they try things out.	To begin to understand the reasons why changes happen. To begin to analyse what has occurred and use scientific vocabulary to describe.	To be able to use scientific vocabulary when writing a conclusion to a test. To use mostly first-hand experiences (with support) to observe but also begin to use secondary sources: books, photographs, videos.	To reflect on results and begin to suggest improvements and raise further questions. To start to recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	To make predictions for new values, suggest improvements and raise further questions. To recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	To use test results to make predictions. To set up further comparative and fair tests. To recognise that scientific ideas change and develop over time. To identify scientific evidence that has been used to support or refute ideas or arguments.	To use test results and scientific knowledge to make predictions. To set up further comparative and fair tests independently. To independently recognise that scientific ideas change and develop over time. To independently identify scientific evidence that has been used to support or refute ideas or arguments.