Fairway Primary School

Science Long Term Planning

EXPLORE ---KNOW---COMMUNICATE

CONCEPTS

OBSERVING OVER TIME
This concept enables children to identify and measure events and changes in living things, materials and physical process or events. These observations may take place over time spans of minutes or hours (e.g. puddles evaporating) up to several weeks or months (e.g. rearing young chicks).
PATTERN SEEKING
This concept helps us to observe, measure and record events and systems when carrying out pattern seeking enquires. Children are encouraged to collect and interpret data. They make observations and conduct surveys where the variables cannot easily be controlled for practical or ethical reasons.
IDENTIFYING, CLASSIFYING & GROUPING
This concept enables children to make sense of how the world is organised. Identification is the process of using differences to name something and classification is organising things into groups. Opportunities to identify arise when children recognise not all birds are the same for example and can identify and name them. They can then use observable and behavioural similarities to group them and add new things.
COMPARATIVE & FAIR TESTING
This concept helps children explore relationship between variables. In comparative tests children compare one event with another e.g. does the red car go faster than the green car? A fair test identifies the causal relationship between two variables. E.g. does the height of the ramp affect how quickly the toy car rolls down the ramp and everything else remains the same.
RESEARCH USING SECONDARY SOURCES
This concept allows children to build their scientific knowledge and understanding by using secondary sources. This is usually where it is impossible or unsafe for children to answer with first hand enquiries. This enquiry helps them evaluate sources, distinguish between fact and opinion and recognise conflicting evidence and bias.
EXPLAINING
This concept enables children to communicate their ideas: predictions; scientific enquiry processes and findings; and conclusions. It empowers children to answer 'how' and 'why'.

EYFS

The statutory EYFS framework aims to ensure that all pupils reach the early learning goal of:

- 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.

SUBJECT CONTENT KS1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

SUBJECT CONTENT LOWER KS2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

SUBJECT CONTENT UPPER KS2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

YEAR 1

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Ask simple scientific questions.
- Use simple equipment to make observations.
- Carry out simple tests.
- Identify and classify things.
- Suggest what I have found out.
- Use simple data to answer questions.

CONCEPTS			
	SCIENCE BLOCK 1 (6 WEEKS ACROSS THE YEAR) **SEASONAL CHANGES**	SCIENCE BLOCK 2 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EGG DROP**
	Observing over time Pattern seeking Research Explaining	Identifying, classifying and grouping Comparative & fair testing Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 5 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 6 (6 WEEKS) **ANIMALS INCLUDING HUMANS**
	Identifying, classifying and grouping Research Explaining	Identifying, classifying and grouping Observing over time Research Explaining	Comparative & fair testing Identifying, classifying and grouping Explaining

NATIONAL CURRICULUM OBJECTIVES	SCIENCE BLOCK 1 (6 WEEKS ACROSS THE YEAR) **SEASONAL CHANGES**	SCIENCE BLOCK 2 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EGG DROP**
	• Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies.	• 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.	• Design purposeful, functional, appealing products for themselves and other users based on design criteria. • Generate, develop, model and communicate their ideas through talking, drawing, templates & mock-ups. • Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing). • Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. • Evaluate their ideas and products against design criteria.
	SCIENCE BLOCK 4 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 5 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 6 (6 WEEKS) **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 a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	• 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.	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

SCIENCE KNOWLEDGE	SCIENCE BLOCK 1 (6 WEEKS ACROSS THE YEAR) **SEASONAL CHANGES**	SCIENCE BLOCK 2 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EGG DROP**
	To know: • The name of the 4 seasons. • Know the order in which the seasons occur. • Describe some changes that happen in each season. • Name and describe different types of weather. • In summer there are more hours of daylight. • In winter there are more hours of darkness. • It is not safe to look directly at the sun.	**To know:** • The names of some materials including: wood, plastic, glass, metal, paper, fabric, foil, water, brick & rock. • Describe the properties of everyday materials using basic terms such as hard/soft, bendy/not bandy, waterproof/not waterproof, absorbent, transparent. • Group objects based on the materials they are made from. • About the work of the scientist John Dunlop.	**To know:** • The names of some everyday materials • That some materials will protect a delicate object
	SCIENCE BLOCK 4 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 5 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 6 (6 WEEKS) **ANIMALS INCLUDING HUMANS**
	To know: • Names a variety of animals. • How to care for and handle animals and to return them to their habitat after studying them. • The terms: **Herbivore, Carnivore & Omnivore** • The names of some animals body parts, such as: **legs, feet, paws, tail, whiskers, gills, fins, beak.**	**To know:** • The names of a range of common plants. • Name the petals, stem, leaf & root of a plant. • Name the roots, trunk, branches & leaves on a tree. • The features of deciduous and evergreen trees.	**To know:** • Name the parts of the human body I can see. • Link the correct part of the human body to each sense.

YEAR 2

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Ask simple scientific questions.
- Use simple equipment to make observations.
- Carry out simple tests.
- Identify and classify things.
- Suggest what I have found out.
- Use simple data to answer questions.

CONCEPTS	SCIENCE BLOCK 1 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 2 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CATAPULTS**
	Identifying, classifying and grouping Comparative & fair testing Explaining	Pattern seeking Observing over time Research Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**
	Comparative & fair testing Observing over time Explaining	Identifying, classifying and grouping Comparative & fair testing Research Explaining	Research Pattern seeking Explaining

NATIONAL CURRICULUM OBJECTIVES	SCIENCE BLOCK 1 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 2 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CATAPULTS**
	• 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.	• Explore and compare the differences between things that are living, dead, and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including microhabitats	• Design purposeful, functional, appealing products for themselves and other users based on design criteria. • Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. • Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing). • Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. • Explore and evaluate a range of existing products. • Evaluate their ideas and products against design criteria.
	SCIENCE BLOCK 4 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS &THEIR HABITATS**
	• Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	• 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.	• 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.

SCIENCE KNOWLEDGE	SCIENCE BLOCK 1 (6 WEEKS) **EVERYDAY MATERIALS**	SCIENCE BLOCK 2 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CATAPULTS**
	To know: • Names of a range of materials • That some materials are used for more than one thing (metal can be used for cans, coins, foil). • That some everyday objects can be made from different materials, (a spoon can be made from metal, plastic or wood) • Why materials are chosen for particular purposes based on their properties (glass suitable for windows because of its transparency) • About the work of the scientists Charles Macintosh.	**To know:** • The characteristics of living things (grow, move, eat, breathe, and reproduce). • What a habitat is and what it provides a living organism. • What a microhabitat is and where they might be found in the school environment. • How living things depend on each other. For example how a plant might be a source of food and protection for an animal. • How animals are suited to their habitat. • The terms: **food, diet, energy, shelter, protection, grow, move, breathe, eat, reproduce (**the children do not need to understand this concept beyond 'have babies or 'make new plants'), **habitat, living, organism, environment.**	**To know:** • That varying force can affect the distance or height of a catapulted missile. • That the size and length of the catapult can affect the distance and height of the catapulted missile
	SCIENCE BLOCK 4 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**
	To know: • That seeds are produced by a plant to reproduce. • That seeds and bulbs need water to grow but most do not need light; seeds and bulbs have their own source of food inside them. • That plants need water, sunlight and • The terms: **seed, plant, flower, grow, stem, leaves, germinate/germination, light, heat, energy store, conditions.**	**To know:** • That animals are born or hatched. • That animals live through a life cycle: Egg, caterpillar, pupa, butterfly; baby, toddler, child, teenager, adult. • That animals need basic requirements to live. • The importance of hygiene for health. • That exercise is important as part of a healthy lifestyle. • The names of some broad food grouping terms: **dairy, meat, vegetables, fruit.**	**To know:** • The names of a variety of plans and animals. • That animals get their food from plants and other animals. • Some simple food chains for example, grass, rabbit, fox. • To know the terms: **carnivore, herbivore and omnivore.**

YEAR 3

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Ask relevant scientific questions.
- Use observations and knowledge toanswer scientific questions.
- Set up a simple enquiry to explore ascientific question.
- Set up a test to compare two things.
- Set up a fair test and explain why it isfair.
- Make careful and accurate observations, including the use ofstandard units.
- Use equipment to makemeasurements.
- Gather, record, classify and presentdata in different ways to answer scientific questions.
- Use diagrams, keys bar charts andtables, using scientific language.
- Use findings to report in differentways, including oral and written explanations.
- Draw conclusions and suggestimprovements.
- Make a prediction with a reason.
- Identify differences, similarities andchanges related to an enquiry.

CONCEPTS	SCIENCE BLOCK 1 (6 WEEKS) **ROCKS**	SCIENCE BLOCK 2 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – MOVING VEHICLES**
	Identifying, classifying and grouping Research Explaining	Observing over time Comparative & fair testing Research Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **FORCES AND MAGNETS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIGHT**
	Comparative & fair testing Pattern seeking Explaining	Pattern seeking Research Explaining	Observing over time Comparative & fair testing Explaining

NATIONAL CURRICULUM	SCIENCE BLOCK 1 (6 WEEKS) **ROCKS**	SCIENCE BLOCK 2 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – MOVING VEHICLES**
	• 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.	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants. • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	• Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups • Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams & prototypes • Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
	SCIENCE BLOCK 4 (6 WEEKS) **FORCES AND MAGNETS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIGHT**
	• Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing.	• 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.	• Recognise that they need light in order to see things and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change.

	SCIENCE BLOCK 1 (6 WEEKS) **ROCKS**	SCIENCE BLOCK 2 (6 WEEKS) **PLANTS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – MOVING VEHICLES**
SCIENCE KNOWLEDGE	**To know:** • The three main types of rock: sedimentary, igneous & metamorphic. • How each type of rock is formed (in basic terms). • To name some common types of rock, for example: sandstone, granite, marble, slate, limestone, basalt & chalk. • That a fossil is formed over thousands of years when a living thing dies and is trapped in rock. • About the work and significance of Mary Anning. • That soil is made up of organic materials, minerals (from broken down rocks), air and water.	**To know:** • The function of the roots in a flowering plant is to take in water and nutrients form the soil and anchor it in place. (They are usually covered in tiny hairs). • The function of a stem in a flowering plant is to provide support and to transport nutrients and water to other parts of the plant. • The function of the leaves in a flowering plant is to take in light from the sun which is turned into food for the plant. • The function of the flower in a flowering plant is to make seeds in order to reproduce. The petals scent and colours of the flower attract insects that help with pollination. **NB: children are not introduced to the process of photosynthesis until KS3.** • The life cycle of a flowering plant. • How some seeds are dispersed. (On the wind – dandelion seeds, by attaching to animals or exploding out of seed head) • That plants need the right conditions to live and grow: ait, light, water, nutrients from soil and room to grow. • Not all plants need exactly the same conditions to live and grow, for example watercress and cacti.	**To Know:** • The materials used to make the vehicle can affect the performance of the vehicle • How to attach an axle and wheels to a vehicle • How different materials have different properties that make them more suited to being a vehicle. • The work of the scientist John McAdam

	SCIENCE BLOCK 4 (6 WEEKS) **FORCES AND MAGNETS**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIGHT**
SCIENCE KNOWLEDGE	**To know:** • That forces will change the motion(movement) of an object. They will either make it start to move, speed it up, slow it down or make it stop. • That magnets can act without direct contact. • Some everyday uses of magnets, on a fridge door for example. • The name of some different types of magnet: bar, button, horseshoe. • Some forces need contact, pushing a swing for example. • Magnets have a north and south pole which are found at opposite ends of a magnet. • Opposite poles on a magnet attract. • Like poles on a magnet repel. • The names of some magnet materials. • The names of some non-magnetic materials. • The terms: **magnet, magnetic, force, friction, attract, repel, poles.**	**To know:** • That plants make their own food but animals, including humans cannot. • That animals, including humans get their nutrition from what they eat. • That there are different food groups. • That **carbohydrates** provide energy. • That **protein** helps growth and repair. • That **fibre** helps you digest the food you have eaten. • That **fats** provide energy. • That **vitamins** and **minerals** keep you healthy. • That **water** moves nutrients around the body and helps you get rid of waste. • That too much sugary and fatty foods are unhealthy and can damage our bodies. • That some animals including humans have a **skeleton** – **vertebrate**. • That some animals do not have a skeleton – **invertebrate.** • That some invertebrates have an **exoskeleton** for support and protection, for example a crab, scorpion or snail. • The function of a skeleton in animals including humans: **support, protection** and **movement.** • The role of **muscles** in the movement of animals including humans. • Muscles are attached to bones with **tendons**. • That muscles can only pull so must work in pairs to move bones, **triceps** and **bicep** for example. • The terms: see bold above.	**To know:** • That we need light in order to see. • That darkness is the absence of light. • A number of light sources, eg. Electric light, candle, sun. **The moon is not a light source.** • That it is dangerous to look directly at the sun. • Eyes can be protected when looking at bright lights. • Mirrors and other surfaces reflect light. • Light from a source can be blocked – resulting in shadows. • Shadows can change size when a light source moves or the distance between an object and the light source changes. • The terms: **source, light, reflect/reflective, bright, dull, mirror, opaque, transparent, translucent.**

YEAR 4

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Ask relevant scientific questions.
- Use observations and knowledge to answer scientific questions.
- Set up a simple enquiry to explore a scientific question.
- Set up a test to compare two things.
- Set up a fair test and explain why it is fair.
- Make careful and accurate observations, including the use of standard units.
- Use equipment to make measurements.
- Gather, record, classify and present data in different ways to answer scientific questions.
- Use diagrams, keys bar charts and tables, using scientific language.
- Use findings to report in different ways, including oral and written explanations.
- Draw conclusions and suggest improvements.
- Make a prediction with a reason.
- Identify differences, similarities and changes related to an enquiry.

CONCEPTS	SCIENCE BLOCK 1 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 2 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – KITE POWERED CAR**
	Research Pattern seeking Explaining	Identifying, classifying and grouping Comparative & fair testing Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **SOUND**	SCIENCE BLOCK 5 (6 WEEKS) **STATE OF MATTER**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS AND THEIR HABITATS**
	Comparative & fair testing Pattern seeking Explaining	Identifying, classifying and grouping Explaining Observing over time	Identifying, classifying and grouping Explaining

NATIONAL CURRICULUM	SCIENCE BLOCK 1 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 2 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – KITE POWERED CAR**
	• 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.	• Identify common appliances 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 opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors.	• Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups • Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams & prototypes • Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
	SCIENCE BLOCK 4 (6 WEEKS) **SOUND**	SCIENCE BLOCK 5 (6 WEEKS) **STATE OF MATTER**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS AND THEIR HABITATS**
	• 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.	• 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.	• Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things. • About the work of the scientist Jane Goodall.

	SCIENCE BLOCK 1 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 2 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – KITE POWERED CAR**
SCIENCE KNOWLEDGE	**To know:** • The main body parts associated with the digestive system, such as mouth, tongue, teeth, oesophagus, stomach, intestine, gall bladder, anus. • The function of each body part (above) involved in the digestive process. • The different types of teeth in humans and some animals. • The different functions of teeth in humans and other animals eg, canines for tearing, molars for grinding food. • The differences in teeth in herbivore, carnivore and omnivores. • What can damage the teeth and how to look after them. • A number of plausible food chains explaining the relationship between the plants and animals and the energy transfer. (Children should not make unrealistic food chains – grass, rabbit, fox, lion for example or fish, penguin, polar bear), and should show an awareness of apex predators in different habitats. • The terms: **herbivore, omnivore, carnivore, incisor, canine, molar, premolar, stomach, small intestine, large intestine, oesophagus, gall bladder, liver, rectum, anus, duodenum, producer, predator, prey, food chain.**	**To know:** • Electricity can be dangerous and know how to stay safe. • The names of some appliances that use electricity – mains and battery powered. • Electricity can only flow around a complete circuit. • There must be wires connected to both the positive and negative end of the power supply/battery. • How to construct a simple series circuit with a component in it. The names of simple components: cell, wire, bulb, switch and buzzer. **NB: in science we refer to a single battery as a 'cell'** • That a switch enables a circuit to be broken or complete. • That some materials conduct electricity (allow it to flow through) • That some materials are insulators (not allowing electricity to flow through) • The names of some insulators and conductors of electricity. • The terms: **electricity/electrical, circuit, complete, broken, switch, wire, cell, battery, wire, bulb, buzzer, motor, conductor, insulator, appliances, energy, renewable, non-renewable.** **NB: Y4 children are not required to use conventional circuit symbols.**	**To know:** • The materials used to make the vehicle can affect the performance of the vehicle • How to attach an axle and wheels to a vehicle • How different materials have different properties that make them more suited to being a vehicle. • That wind can be harnessed and used to power a vehicle.

	SCIENCE BLOCK 4 (6 WEEKS) **SOUND**	SCIENCE BLOCK 5 (6 WEEKS) **STATE OF MATTER**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS AND THEIR HABITATS**
SCIENCE KNOWLEDGE	**To know:** • Sound is a type of energy. Sounds are created by vibrations. The louder the sound, the bigger the vibration. • That different musical instruments can make different sounds. • Some instruments make high pitched sounds (piccolo, triangle, violin). • Some instruments make low pitched sounds (double bass, bassoon, cello). • The size of an instrument is linked to its pitch: a larger instrument will make a low pitched sound, a tuba compared to a cornet for example. • How the pitch and volume can be changed on a range of instruments: by shortening the string length on a violin by pressing a finger on it or by striking a drum or pulling a bow across a string with greater force. • Sound (vibrations) can pass through solids, liquids and gases to the ear. • That sounds get fainter the further away they are made. • Some materials that can be used to quieten a sound (soundproofing). • The terms: **sound, vibration, distance, pitch, volume, absorb, instrument.** **NB: children do not need to know how the ear works in detail at this stage.**	**To know:** • There are 3 states of matter: **Solid, Liquid & Gas.** **Children do not need to know about the 4th state of matter – plasma, in key stage 2** • That a solids hold their shape. • That a liquid can form a pool rather than a pile. • That a gas can escape from an unsealed container. • That water can be a solid, liquid or gas and know what conditions are need for each state to occur. • That other materials can change state by **cooling** or **heating**, chocolate for example. • The **temperature** at which water freezes and becomes a solid. • The temperature at which water boils and becomes a gas. • **Evaporation** occurs when water turns into water vapour. This happens quickly when the water is hot and can happen slowly, like a puddle evaporating in the warm air. • **Condensation** occurs when water vapour is cooled down and turns into water. • How evaporation and condensation work in the context of the **water cycle**. • The terms: see above in bold	**To know:** • That habitats change throughout the year in line with seasonal change (making links to Y1 learning). • How to group a range of living things into broad groups including animals, flowering plants and non-flowering plants. • How to put vertebrate animals into groups such as fish, birds, mammals, amphibians and reptiles. • How to group invertebrate animals such as snails, crabs, worms, spiders and insects. • How humans impact on environments (both positive – nature reserves, garden ponds and negative – deforestation, litter). • How humans activity (above) impacts on animals and plants in those places positive and negative. • How to make and use a classification key/ branching diagram to identify and sort animals and plants according to observable features. • The terms: **mammal, fish, bird, amphibian, reptile, insect, invertebrate, vertebrate, plant, flowering/non-flowering, classification key.**

YEAR 5

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Plan different types of scientificenquiry.
- Control variables in an enquiry.
- Measure accurately and preciselyusing a range of equipment.
- Record data and results using scientific diagrams and labels, classification keys, tables, scattergraphs, bar and line graphs.
- Use the outcome of test results to make predictions and set up a furthercomparative fair test.
- Report findings from enquires in arange of ways.
- Explain a conclusion from an enquiry.
- Explain. Causal relationships in an enquiry.
- Relate the outcomes from an enquiryto scientific knowledge in order to state whether evidence supports or refutes and argument/ theory.

Read, spell and pronounce scientificvocabulary accurately

CONCEPTS			
	SCIENCE BLOCK 1 (6 WEEKS) **FORCES**	SCIENCE BLOCK 2 (6 WEEKS) **PROPERTIES AND CHANGES OF MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CHAIN REACTION**
	Comparative & fair testing Explaining Research	Identifying, classifying and grouping Comparative & fair testing Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **LIVING THINGS AND THEIR HABITATS**	SCIENCE BLOCK 5 (6 WEEKS) **EARTH AND SPACE**	SCIENCE BLOCK 6 (6 WEEKS) **ANIMALS INCLUDING HUMANS**
	Pattern seeking Research Explaining	Research Explaining	Observing over time Research Explaining

NATIONAL CURRICULUM	SCIENCE BLOCK 1 (6 WEEKS) **FORCES**	SCIENCE BLOCK 2 (6 WEEKS) **PROPERTIES AND CHANGES OF MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CHAIN REACTION**
	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	• Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams & prototypes. • Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities • Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
	SCIENCE BLOCK 4 (6 WEEKS) **LIVING THINGS AND THEIR HABITATS**	SCIENCE BLOCK 5 (6 WEEKS) **EARTH AND SPACE**	SCIENCE BLOCK 6 (6 WEEKS) **ANIMALS INCLUDING HUMANS**
	• 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.	• 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.	• Describe the changes as humans develop to old age.

	SCIENCE BLOCK 1 (6 WEEKS) **FORCES**	SCIENCE BLOCK 2 (6 WEEKS) **PROPERTIES AND CHANGES OF MATERIALS**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – CHAIN REACTION**
SCIENCE KNOWLEDGE	**To know:** • What air resistance is and explain its effects on falling objects. • What water resistance is and explain its effect on movement through water. • How forces make things move, get faster or slow down. • That gravity is an invisible force that acts on unsupported objects causing them to fall to the Earth. • How friction acts to slow and stop moving objects and apply their knowledge to a real life example (a brake on a bicycle wheel). • That simple machines, pulleys, and levers can reduce the force needed to make an object move. 'Mechanical advantage'. • About the work of Galileo Galilei and Isaac Newton in developing the theory of gravitation.	**To know:** • The names of everyday materials. • Properties by which materials could be grouped and explain those properties eg. Transparency means it is see through. • How to apply their y3 and y4 knowledge of magnetism and conductivity to their learning. • When a change is reversable or irreversible. • That evaporating, filtering, sieving, melting and dissolving are examples of reversable change. • That burning, rusting and other reactions (such as vinegar and bicarbonate of soda) are examples of irreversible change. • The difference between melting and dissolving. • How to dissolve some materials and how to retrieve them. • About the work of Spencer Silver (the inventor of post it note glue) • The terms: **dissolve, melt, change, properties, state, liquid, solid, gas, reversable, irreversible, solution, conductor/conductivity, sieve, separate, reaction**	**To know:** • That the position of objects next to each other can allow a chain reaction to occur. • How to equipment to measure length and mass accurately.

	SCIENCE BLOCK 4 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**	SCIENCE BLOCK 5 (6 WEEKS) **EARTH & SPACE**	SCIENCE BLOCK 6 (6 WEEKS) **ANIMALS INCLUDING HUMANS**
SCIENCE KNOWLEDGE	**To know:** • The life cycle of a mammal. • The life cycle of a bird. • The life cycle of an amphibian. • The life cycle of an insect. • How life cycles differ between the above groups. • The life cycle of a flowering plant and a vegetable plant. • About the work of scientist David Attenborough. • About different types of reproduction – sexual and asexual in plants and sexual in animals. • The terms: **reproduction, asexual, sexual, pollinate/pollination, fertilise, gestation, life cycle, metamorphosis, stamen, style, ovule, egg sperm, cells.**	**To know:** • The name of the 8 planets in our solar system (Pluto is not included in this list anymore and has been re-classified as a dwarf planet). • The order of the planets from the sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. • That the sun is a star at the centre of our solar system • That a moon is a is a celestial body that orbits a planet (Earth has 1 moon, Jupiter has 4 large moons and numerous small ones). • How night and day work using a model to explain and demonstrate their understanding. • The terms: solar system, star, moon, sun, orbit, axis • That ideas about the solar system have changed and developed over time – understanding how the geocentric model of the solar system gave way to the heliocentric model. • About the work of scientists Ptolemy, Alhazen and Copernicus.	**To know:** • The stages in the growth and development in humans. • The changes that occur in male and female bodies as they grow during puberty. • The gestation periods of humans and other mammals eg rabbit, elephant, horse. • The terms: **reproduction, sexual, fertilise, gestation, life cycle, egg sperm, cells, fertilisation, prenatal, infancy, childhood, adolescence, larynx, pubic, scrotum, penis, testes, vagina, uterus, ovaries, menstruate/menstruation.**

YEAR 6

SCIENTIFIC SKILLS (Taught throughout the year)

WORKING SCIENTIFICALLY

- Plan different types of scientificenquiry.
- Control variables in an enquiry.
- Measure accurately and preciselyusing a range of equipment.
- Record data and results using scientific diagrams and labels, classification keys, tables, scattergraphs, bar and line graphs.
- Use the outcome of test results to make predictions and set up a furthercomparative fair test.
- Report findings from enquires in arange of ways.
- Explain a conclusion from an enquiry.
- Explain causal relationships in anenquiry.
- Relate the outcomes from an enquiryto scientific knowledge in order to state whether evidence supports or refutes and argument/ theory.
  Read, spell and pronounce scientificvocabulary accurately

CONCEPTS			
	SCIENCE BLOCK 1 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 2 (6 WEEKS) **LIGHT**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EPIC FAIL INVENTION FAIR**
	Identifying, classifying and grouping Comparative & fair testing Explaining	Observing over time Research Pattern seeking Explaining	Pattern seeking Comparative & fair testing Explaining
	SCIENCE BLOCK 4 (6 WEEKS) **EVOLUTION & INHERITANCE**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**
	Identifying, classifying and grouping Research Explaining	Research Comparative & fair testing Pattern seeking Explaining	Identifying, classifying and grouping Pattern seeking Explaining

NATIONAL CURRICULUM	SCIENCE BLOCK 1 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 2 (6 WEEKS) **LIGHT**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EPIC FAIL INVENTION FAIR**
	• 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.	• 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.	• Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams & prototypes. • Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities • Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
	SCIENCE BLOCK 4 (6 WEEKS) **EVOLUTION & INHERITANCE**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**
	• 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.	• 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	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics.

SCIENCE KNOWLEDGE	SCIENCE BLOCK 1 (6 WEEKS) **ELECTRICITY**	SCIENCE BLOCK 2 (6 WEEKS) **LIGHT**	SCIENCE BLOCK 3 (6 WEEKS) **STEM CHALLENGE – EPIC FAIL INVENTION FAIR**
	To know: • How to stay safe when working with electrical circuits and their components. • The names of the basic electrical circuit components and their function; **cell, battery, wire, bulb, motor, buzzer, switch.** • The symbol for each of the electrical component (above). • How to construct a simple circuit. • The terminology: **resistance, series, parallel, amps, volts/voltage, current.** • What happens to the brightness of a bulb when more bulbs or other components are added to a circuit. • About the work of the scientist Michael Faraday. **NB: children are not required to construct parallel circuits in key stage 2**	**To know:** • That light comes from a range of sources, some natural and some manmade. • That the moon is NOT a light source but reflects light from the sun. • That it is dangerous to look directly at the sun with eye protection. • That darkness is the absence of light (Y3 objective – knowledge revisited). • That we see because light travels into our eyes directly or after being reflected off a surface. • That shadows can change size when the relationship between an object and the light source is changed. • That light can be reflected to allow us to see behind, above or below (rear-view mirrors, periscopes).	**To know:** • How to use a ruler to make technical drawings to scale • How to use equipment to cut and join materials together • How to make and use gears and levels.
	SCIENCE BLOCK 4 (6 WEEKS) **EVOLUTION & INHERITANCE**	SCIENCE BLOCK 5 (6 WEEKS) **ANIMALS INCLUDING HUMANS**	SCIENCE BLOCK 6 (6 WEEKS) **LIVING THINGS & THEIR HABITATS**

	To know: • Of the work of Charles Darwin & Alfred Wallace and Mary Anning (revisited from Y3). • How fossils are made (Y3) and how they help scientists find out about animals and plants from long ago. • That animals and plants have changed over time. • That characteristics are passed from parents to offspring, for example eye colour. • That variation over time can make animals more or less able to survive in particular environments. • The terms: **adaption, inheritance/inherit, evolution/evolve, natural selection, offspring, species, variation, reproduce**	**To know:** • The names and locations of the major organs/body parts: oesophagus, stomach, intestine (Y4), lung, heart, blood vessels. • The function of the heart and lungs. • The main components of blood and their function. • The body has a double circulatory system. • Some of the ways drugs, alcohol & a sedentary lifestyle can affect the circulatory and respiratory systems. • That the heart has 4 chambers and 4 valves. • The terminology: **aorta, arteries, atrium, blood vessels, capillaries, circulation, oxygenated, deoxygenated, carbon dioxide, oxygen, nutrients, pulse, respiration, veins, vena cava, ventricle.** • That **respiration** is one of the 7 life processes. • The basics ideas of diffusion and osmosis in the transportation of nutrients and water to cells.	**To know:** • The classification groups for vertebrates: mammal, reptile, fish, bird, amphibian and invertebrates: eg snail, slugs, worms, spiders, insects. (Y4) • That broad groups such as micro-organisms, plants and animals can be subdivided according to their observable differences. • How to use a classification diagram or key. • About the scientist Carl Linnaeus and his work. • To know the terms: **Kingdom, phylum, class, order, family, genus, species; taxonomy, classification, vertebrate/invertebrate, micro-organism.**