



Subject Intent

The National Curriculum states that the aim of the Science curriculum is to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- make sure children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

At Lisle Marsden we aim to achieve these objectives through the delivery of a broad and ambitious science curriculum, rich in skills and knowledge. We want to ensure they are equipped with the skills they need for their future life and be able to record and share scientific understanding and findings in a coherent way. Furthermore, the curriculum will promote spiritual development.

By the time the children leave in Year 6 we aim to have ignited their curiosity for learning in science and teach them how to ask 'how' and 'why' things work as they do. We will do this through teaching the children in a safe environment to plan, deliver and evaluate scientific experiments. Children will be confident to ask challenging questions to develop their understanding of the world around them.

Subject Sequence

Yr	Term / Unit
1	Forces and Space - Seasonal Changes
1	Materials – Everyday materials
1	Animals- Sensitive Bodies
1	Animals – Comparing Animals
1	Plants – Introduction to Plants
2	Living Things - Habitats
2	Living Things - Microhabitats
2	Materials – Uses of everyday materials
2	Animals – Life cycles and health
2	Plants – Plant Growth

Yr	Term / Unit
3	Animals – Movement and Nutrition
3	Forces and Spaces – Forces and Magnets
3	Materials – Rocks and Soil
3	Energy – Light and Shadows
3	Plants – Plant reproduction
4	Animals – Digestion and Food
4	Energy – Electricity and circuits
4	Materials – States of Matter
4	Energy – Sound and Vibrations
4	Living Things – Classification and changing habitats

Yr	Term / Unit
5	Materials – Mixtures and Separation
5	Materials – properties and changes
5	Forces and Space – Earth and Space
5	Living Things – Life Cycles and Reproduction
5	Forces and Space – Unbalanced Forces
6	Living Things – Classifying Big and Small
6	Energy – Light and Reflection
6	Living Things – Evolution and Inheritance
6	Energy – Circuits, batteries and switches
6	Animals – Circulation and Health

Implementation

To meet the aims of the National curriculum for science and in response to the Ofsted research review three key strands have been identified:

- Scientific knowledge and understanding of:
 - biology: living organisms and vital processes;
 - chemistry: matter and its properties;
 - physics: how the world we live in 'works'.
- Working scientifically: processes and methods of science to answer questions about the world around us.
- Science in action: uses and implications of science in the past, present and for the future.

At Lisle Marden we have decided to use the Kapow scheme for science to effectively meet these strands. Kapow Primary's Science scheme is a spiral curriculum, with essential knowledge and skills revisited with increasing complexity, allowing pupils to revise and build on their previous learning. A range of engaging recall activities promotes frequent pupil reflection on prior learning, ensuring new learning is approached with confidence. The Science in action strand is interwoven throughout the scheme to make the concepts and skills relevant to pupils and inspiring for future application. Cross-curricular links are included throughout each unit, allowing pupils to make connections and apply their science skills to other areas of learning.

Each unit is based on one of the key science disciplines: biology, chemistry and physics. The National curriculum content has been grouped into six key areas of science to show progression throughout the school:

Plants.
Animals, including humans.
Living things and habitats.
Materials.
Energy.
Forces, Earth and space.

Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant, specialist vocabulary. As suggested in Ofsted research review: science (April 2021), the '**Working scientifically skills**' are integrated with conceptual understanding rather than taught discretely to provide frequent but relevant opportunities for developing scientific enquiry skills. The scheme utilises practical activities that aid in the progression of individual skills and provide opportunities for full investigations.

In EYFS (Reception), pupils build a solid foundation for science before transitioning to Key stage 1. Through hands-on exploration and focused observations, lessons spark curiosity and foster an early appreciation for the natural environment, paving the way for more structured scientific learning in Key stage 1. Lessons incorporate various teaching strategies, from independent tasks to paired and group work, including practical, creative, computer-based and collaborative tasks. This variety means that lessons are engaging and appeal to those with different learning styles. In Year 1, the transition into the Key stage is eased by providing a selection of activities: some adult-led, some independent tasks and some that can be used during continuous provision to suit your set-up. Guidance for adapting the learning is available for every lesson to ensure that all pupils can access it and opportunities to stretch their learning are available when required. Knowledge organisers for each unit help to identify key learning and vocabulary and can be useful as an adaptive teaching tool or to revise learning from the unit.

Strong subject knowledge is vital for staff to deliver a highly effective and robust science curriculum. Each unit of lessons includes teacher videos and resources to develop subject knowledge, target fundamental misconceptions effectively and support ongoing CPD. Kapow has been created to build confidence amongst non-specialist primary teachers who are required to deliver and assess the full science curriculum and maximise pupil progression. Videos created by subject specialists feature troubleshooting advice for practical work that does not go to plan, suggested questioning and support for tackling misconceptions and recordings of practical tasks that can be utilised as demonstrations in the classroom or to support pupil reflection on their own observations.

Impact

The impact of Kapow Primary's Science scheme can be constantly monitored through both formative and summative assessment opportunities. Each lesson includes guidance to support teachers in assessing pupils against the learning objectives and any relevant scientific enquiry skills. Furthermore, each unit has a unit quiz and a knowledge and skills catcher, which can be used at the beginning or end of the unit to provide a summative assessment. Opportunities for pupils to communicate using scientific vocabulary will also form part of the assessment process in each unit. After implementing Kapow Primary Science, pupils should leave school equipped with the requisite skills and knowledge to succeed in science at Key stage 3. They will have the necessary tools to confidently and meaningfully question and explore the world around them and critically and analytically experience and observe phenomena. Pupils will understand the significance and impact of science on society. The expected impact of following the Kapow Primary Science scheme of work is that pupils will:

- Develop early scientific thinking skills through hands-on exploration and sensory experiences in EYFS (Reception).
- Develop a body of foundational knowledge for the biology topics in the National curriculum: Plants; Animals, including humans; Living things and their habitats; and Evolution and inheritance.
- Develop a body of foundational knowledge for the chemistry topics in the National curriculum: Everyday materials; Uses of everyday materials; Properties and changes of materials; States of matter; and Rocks.
- Develop a body of foundational knowledge for the physics topics in the National curriculum: Seasonal changes; Forces and magnets; Sound; Light; Electricity; and Earth and space.
- Evaluate and identify the methods that 'real world' scientists use to develop and answer scientific questions.
- Identify and use equipment effectively to accurately gather, measure and record data.
- Be able to display and convey data in a variety of ways, including graphs.
- Analyse data to identify, classify, group and find patterns.
- Use evidence to formulate explanations and conclusions.
- Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.
- Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.
- Meet the end of key stage expectations outlined in the National curriculum for science.

At Lisle Marsden the children are assessed individually against the substantive and disciplinary knowledge at the end of each unit.

SUBJECT Progression (Science: Subject Knowledge)

Progression of knowledge

Plants

		EYFS: Reception	Year 1 <u>Introduction to plants</u>	Year 2 <u>Plant growth</u>	Year 3 <u>Plant reproduction</u>
Scientific knowledge and understanding	Plant structure and function	To know the name for the basic plant parts (leaves, flowers, stem and roots.) To know the names of some familiar flowering plants (e.g. daisy, rose, sunflower, daffodil).*	To know a variety of common plants, and how they differ. To know that deciduous trees lose their leaves seasonally, but evergreen trees do not. To know the basic structure (including leaves, flowers (blossom), fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.		To understand the functions of the basic parts of a plant and the relationship between structure and function. To know that water is transported within a plant from the root, through the stem, to the leaves.
	Plant growth and needs	To know plants are alive. To know that seeds need water to grow.	To begin to understand how plants grow and change over time.	To know that seeds and bulbs grow into seedlings by producing roots and shoots. To know that seedlings grow into mature plants by developing parts such as roots, stems, leaves and flowers. To know that seeds need water and warmth to germinate. To know that plants need water, light and a suitable temperature for growth and health.	To know that plants need water, light, air, nutrients and a suitable temperature for growth and health. To understand that the needs for growth and health vary from plant to plant.
	Plant life cycle	To know that seeds grow into plants if taken care of.			To know the life cycle of a plant from seed to mature plant. To know that flowers are the reproductive organ of a plant. To know that the process of pollination is the transfer of pollen to the female (part of the) flower. To know that the process of seed formation is the growth of a seed after pollination.. To know some different methods of seed dispersal and the benefits of each.

		EYFS: Reception <u>Animal adventures</u>	Year 1 <u>Sensitive bodies</u> <u>Comparing animals</u>	Year 2 <u>Life cycles and health</u>	Year 3 <u>Movement and nutrition</u>
Scientific knowledge and understanding	Animal growth	To know the names of familiar animals (e.g. farm animals, pets and animals seen in storybooks.)	To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).	To understand how living things change, and that animals have offspring that grow into adults. To know which offspring comes from which parent animal. To know the stages in some animal life cycles.	
	Animal structure and function	To know the main body parts of common animals (number of legs, wings, fur, tail). To know that animals, including humans use their senses to explore the world.	To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell) To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth). To know the five main senses: sight, smell, hearing, taste and touch. To know that the skin is used for touch, the tongue is used for taste, the nose is used for smell, the eyes are used for sight and the ears are used for hearing.		To know that animals can be grouped based on the presence of a skeleton. To know that the skeleton in humans and some animals is used for movement, protection and support. To know that the muscular system in humans and some animals works with the skeleton for movement. To know the main bones in the body.
	Health and nutrition	To know that animals need food.	To know that a carnivore is an animal that eats other animals and give some examples. To know that a herbivore is an animal that eats only plants and give some examples. To know that an omnivore is an animal that eats both animals and plants, and to give some examples.	To know that animals, including humans, need water, food and air to survive. To understand the importance of exercise, a balanced diet and hygiene for humans.	To know that animals, including humans, need the right types and amount of nutrition. To understand that humans cannot make their own food and therefore eat to get the nutrition needed. To know the main nutrient groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions. To know that a balanced diet should include all nutrient groups. To describe the diets of different animals.

Progression of knowledge

Animals, including humans

		Year 4 <u>Digestion and food</u>	Year 5 <u>Human timeline</u>	Year 6 <u>Circulation and health</u>
Scientific knowledge and understanding	Animal growth		To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly). To describe changes that occur during puberty (in boys and girls). To know that gestation periods vary across mammals.	
	Animal structure and function	To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.		To know the main parts of the human circulatory system (heart, blood vessels and blood). To know that the heart pumps blood around the body. To know that the blood vessels transport blood around the body. To know that the blood transports vital substances around the body, including oxygen and nutrients. To understand the relationships between different organ systems.
	Health and nutrition	To know that teeth can be damaged, including the effect of sugary and acidic food. To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. To describe the teeth of carnivores and herbivores, and understand why they are different. To know that predators hunt for their food and prey are the animals being hunted. To know that producers make their own food. To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.		To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions. To know that the heart rate is the number of beats per minute. To know that exercise increases heart rate.

		EYFS: Reception <u>Animal adventures</u>	Year 2 <u>Habitats</u> <u>Microhabitats</u>	Year 4 <u>Classification and changing habitats</u>
Scientific knowledge and understanding	Characteristics of living things	To know that animals and plants move, grow and feed. To know the difference between things that are living and things that are non-living. To know that some animals hibernate or store food in winter.*	To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition. To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.	To know that living things can be grouped in different ways. To know that a classification key can be used to group and identify plants and animals. To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone. To know that plants can be grouped into flowering or non-flowering varieties. To know that flowering plants include grasses and non-flowering plants includes ferns and mosses. To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish. To know that invertebrate groups include snails, slugs, worms, spiders and insects.
	Variation and inheritance	To know the names of familiar animals (e.g. farm animals, pets and animals seen in storybooks.)* To know the names of some familiar flowering plants (e.g. daisy, rose, sunflower, daffodil).*	To know a variety of plants and animals and describe some differences.	
	Habitats and interdependence	To know that plants and animals live in a range of different places (land, sea, air). To name some different places where animals live on the school site.	To name a variety of habitats, including woodland, ocean, rainforest and seashore. To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive. To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter). To know that living things depend upon each other (e.g. for food, shelter.) To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.	To know that habitats can change throughout the year and this can be dangerous for living things. To know that humans can have both a positive and negative impact on the environment.

		Year 5 <u>Life cycles and reproduction</u>	Year 6 <u>Classifying big and small</u> <u>Evolution and inheritance</u>
Scientific knowledge and understanding	Characteristics of living things		To know that 'organism' is a term used to refer to an individual living thing. To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye. To know the characteristics of the different groups of vertebrates and commonly found invertebrates.
	Variation and inheritance	To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again. To know that all living things must reproduce for the species to survive. To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent. To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).	To know that living things have changed over time. To know that fossils provide us with information about living things that inhabited the Earth millions of years ago. To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents. To know that over time, variation in offspring can affect animals' chances of survival in particular environments.
	Habitats and interdependence		To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.

		EYFS: Reception	Year 1 <u>Everyday materials</u>	Year 2 <u>Uses of everyday materials</u>	Year 3 <u>Rocks and soil</u>
Scientific knowledge and understanding	Identifying and naming	To recognise that things around us are made from different materials.	To know that objects are items or things. To know that a material is what an object is made from. To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.		To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.) To know that rocks may contain grains, crystals or fossils. To know that grains and crystals appear differently and can be used to classify rocks. To know that soils are made from rocks and dead matter.
	Properties and uses	To describe materials using the senses (hard, soft, strong, bendy).	To know that property refers to how a material can be described. To describe the physical properties of a variety of everyday materials. To understand that materials can be grouped based on their physical properties.	To know why objects are made from particular materials and to give examples of their suitability. To know that one material can be used for a range of purposes (and to give examples.) To know that different materials can be used for the same purpose (and to give examples.) To know why certain materials are unsuitable for particular objects.	To understand the relationship between the properties of rocks and their uses.
	Change	To understand that some materials can change shape.		To know that a push or pull must be applied to change the shape of a solid object. To know that solid objects can be squashed, bent, twisted or stretched. To know that different solid objects may take a different amount of force to change shape.	To know that fossils can form from the remains of living things. To know that rocks can change over time (e.g. erosion, weathering).

		Year 4 <u>States of matter</u>	Year 5 <u>Mixtures and separation</u> <u>Properties and changes</u>
Scientific knowledge and understanding	Identifying and naming	To know that all substances around us can exist as solids, liquids and gases.	
	Properties and uses	To know that a property of a solid is that it keeps its shape unless a force is applied to it. To know that a property of a liquid can flow freely and take on the shape of a container. To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.	To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.
	Change	To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating). To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing). To know that water can exist as a solid, a liquid or a gas. To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius. To know that water flows around the world in a continuous process called the water cycle. To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour. To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation. To know that the rate of evaporation increases as temperature rises.	To know that some substances will dissolve in a liquid to form a solution. To know the factors that affect the time taken to dissolve, including temperature and stirring. To understand that dissolving, mixing and changes of state are reversible changes. To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes. To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)

		Electricity	
		Year 4 <u>Electricity and circuits</u>	Year 6 <u>Circuits, batteries and switches</u>
Scientific knowledge and understanding	Sources	To know that all electrical appliances need a power source, including batteries or mains electricity. To know that an electrical circuit needs a complete path for the electrical charge to flow through. To know the main components in a simple series circuit. To know the precautions for working safely with electricity.	To know a wider variety of components in a series circuit (including buzzer and motor). To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.
	Transfer	To know that some materials allow electrical charge to pass through them quickly and these are known as electrical conductors (e.g. metals). To know that some materials do not allow electrical charge to pass through them easily and these are known as electrical insulators (e.g. wood and plastic). To know that metals are used for cables and wires because they are good conductors of electricity. To know that plastic is used to cover cables and wires because it is a good insulator.	
	Factors affecting energy	To understand that an open switch breaks a series circuit so the components will be off. To understand that a closed switch completes a series circuit so the components will be on. To understand the relationship between bulb brightness and the number of bulbs in a circuit.	To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).

Progression of knowledge

Energy

		Light		Sound
		Year 3 Light and shadows	Year 6 <u>Light and reflection</u>	Year 4 <u>Sound and vibrations</u>
Scientific knowledge and understanding	Sources	To know that light travels from a source (e.g. the Sun, light bulbs and torches). To know that light is needed to see things and that dark is the absence of light. To know that light from the Sun can be dangerous and how to protect their eyes.	To know that light travels in a straight line from a light source. To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye.	To understand that sound is a result of vibrations.
	Transfer	To know that all materials reflect light. To know that shadows are formed when the light from a light source is blocked by an opaque object.	To know that shiny surfaces reflect light uniformly. To know that when light is reflected off a surface, its direction changes. To know that mirrors and periscopes work using reflection of light on smooth surfaces. To understand why shadows have the same shape as the objects that cast them as a result of light travelling in straight lines. To understand relationships between light sources, objects and shadows.	To know that vibrations from sounds travel through mediums to the ear. To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds. To know that different materials provide different amounts of insulation against sound.
	Factors affecting energy	To know that shadows change as a result of different factors: - Changing the position of the light source. - Changing the distances between the light source, object and surface. To know that shadows change position and length throughout the day as the Sun changes position in the sky.	To understand how and why the distance between the object and the screen affects the size of the shadow. To understand how the angle of a reflected ray is affected by the angle of the incoming ray on a smooth surface.	To know a variety of ways to change the pitch or volume of a sound. To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds. To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds. To know that sounds get fainter as the distance from the sound source increases.

		EYFS: Reception <u>Changing seasons</u>	Year 1 <u>Seasonal changes</u>	Year 5 <u>Earth and space</u>
Scientific knowledge and understanding	Key facts	To know that some trees change in the four seasons. To know some signs of each season (leaves on the ground, cold weather, daffodils growing and sunny weather.) To know that some animals hibernate or store food in winter.*	To know the name and order of the four seasons; spring, summer, autumn and winter. To know that it is unsafe to look directly at the Sun.	To know that the Sun is a star at the centre of our solar system. To know that the Sun, Earth and Moon are approximately spherical bodies. To know the names, order and relative positions of the planets and other main celestial bodies. To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.
	Forces in motion	To know that the weather changes throughout the year. To know and compare weather types (rain, sun, snow, wind).	To know weather associated with the four seasons and how it changes (in the UK). To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.	To know that the Earth and other planets orbit around the Sun. To know that the tilt of the Earth and its orbit around the Sun causes the seasons. To know that the Moon orbits around the Earth. To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky.
	Factors affecting forces			

		Year 3 <u>Forces and magnets</u>	Year 5 <u>Unbalanced forces</u>
Scientific knowledge and understanding	Key facts	To know some examples of contact and non-contact forces. To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism). To know the North and South poles of a magnet. To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. To know some different examples of magnets, including bar, horseshoe, button and ring, To know some uses of magnets.	To know that gravity is a non-contact force that pulls objects together. To know that air resistance and water resistance are both types of friction.
	Forces in motion	To know that friction is a contact force that acts between two surfaces to slow an object down. To know that magnetism is a non-contact force that affects objects containing magnetic metal. To understand that the opposite poles of a magnet attract one another and like poles repel one another.	To know that unsupported objects fall towards the Earth because of gravity. To know that friction, air resistance and water resistance act in the opposite direction to a moving object. To know that when forces are imbalanced, the speed, shape or direction of an object changes. To know that when forces are balanced the speed, shape or direction of an object stays the same. To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.
	Factors affecting forces	To know that rougher surfaces have more friction between them than smoother surfaces. To understand that the strength of different magnets may vary.	To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement. To know that the larger the surface area of an object the greater the air or water resistance it creates.

SUBJECT Progression (Science: Scientific Enquiry)

Progression of skills

Working scientifically

	EYFS: Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Posing questions	With support, asking questions about the natural world.	Exploring the world around them and raising their own simple questions. Recognising there are different types of enquiry (ways to answer a question). Responding to suggestions on how to answer questions.	Beginning to raise further questions during the enquiry process. Considering what makes a testable question. Beginning to recognise that there are different types of enquiry and that they are suitable for different questions. Beginning to make suggestions about how different questions could be answered.	Raising questions throughout the enquiry process. Identifying testable questions. Selecting the most appropriate enquiry method to answer questions and give justification.			
Planning	Beginning to share ideas and suggestions about what to do, when working practically.	Beginning to recognise whether a test is fair. With support, deciding if suggested observations are suitable. Ordering a simple method.	Beginning to select from options which variables will be changed, measured and controlled. Beginning to suggest what observations to make and how long to make them for. Planning a simple method, verbally and in writing. Beginning to write a simple method in numbered steps. Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.	Suggesting which variables will be changed, measured and controlled. Making and explaining decisions about what observations to make and how long to make them for. Writing a method including detail about how to ensure control variables are kept the same. Writing a method that considers reliability by planning repeated readings. Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.			
Predicting	Beginning to make guesses about what might happen.	Suggesting what might happen, often justifying with personal experience.	Making predictions about what they think will happen by: - Using scientific knowledge and/or personal experience to explain their prediction (because...) - Beginning to consider cause and effect when making predictions, where appropriate. - Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)	Making increasingly scientific predictions by: - Using previous scientific knowledge and evidence to inform their predictions. - Using scientific language to describe a potential outcome or explain why they think something will happen. - Making links between topics to evidence a prediction.			

SUBJECT Progression (Science: Scientific Enquiry)

Progression of skills

Working scientifically

	EYFS: Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Observing (qualitative data)	Commenting on what they see and hear in the natural world.	Using their senses to describe, in simple terms, what they notice or what has changed.		Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.		Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.	
Measuring (quantitative data)	Using non-standard units to measure.	Using non-standard units to measure and compare. Beginning to use standard units and read simple scales to measure and compare. Beginning to use simple measuring equipment to make approximate measurements.		Using standard units to measure and compare. Using measuring equipment with increasing accuracy. Reading scales with unmarked intervals between numbers.		Using standard units to measure and compare with increasing precision (decimals). Reading a wider variety of scales with unmarked intervals between numbers.	
Researching	Recognising that information can be found online and in books.	Gathering specific information from one simplified, specified source.		Gathering specific information from a variety of sources.		Gathering answers to open-ended questions from a variety of sources.	
Recording (diagrams)	Drawing and labelling pictures of plants and animals.	Drawing and labelling simple diagrams.		Beginning to draw more scientific diagrams by: - Using some standard symbols. - Drawing in 2D to produce simple line diagrams. - Labelling with more scientific vocabulary.		Drawing scientific diagrams by: - Using a wider range of standard symbols. - Drawing with increasing accuracy. - Labelling with a broader range of scientific vocabulary. - Annotating diagrams to explain concepts and convey opinions.	
Recording (tables)	Recognising that tables can be used to record information.	Using a prepared table to record results including: - Numbers. - Simple observations. - Tally frequency.		Using a prepared table to record results including more detailed observations. Using tables with more than two columns. Identifying and adding headings to tables. Beginning to design simple results tables.		Using tables with columns that allow for repeat readings. Suggesting headings to tables, including units. Designing results tables with increasing independence with consideration of variables where applicable. Calculating the mean average.	
Grouping and classifying	With support, grouping objects, plants and animals.	Grouping based on visible characteristics. Organising questions to create a simple classification key.		Grouping based on visible characteristics and measurable properties. Populating a pre-prepared branching and number key. Choosing appropriate questions for classification keys.		Grouping in a broader range of contexts. Organising the layout of number and branching keys. Formulating appropriate questions for classification keys.	

SUBJECT Progression (Science: Scientific Enquiry)

Progression of skills

Working scientifically

	EYFS: Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Graphing	N/A	Representing data using pictograms and block graphs.		Representing data using bar charts. Drawing bars with greater accuracy. Reading the value of bars with greater accuracy.		Representing data by using line graphs and scatter graphs. Plotting points with greater accuracy. Reading the value of plotted points with greater accuracy.	
Analysing and drawing conclusions	Describing their discoveries when working practically.	Using their results to answer simple questions. Beginning to recognise when results or observations do not match their predictions.		Writing a conclusion to summarise findings using simple scientific vocabulary. Beginning to suggest how one variable may have affected another. Beginning to quote results as evidence of relationships. Identifying data that does not fit a pattern (anomalous data). Recognising when results or observations do not match their predictions. Beginning to use identified patterns to predict new values or trends.		Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. Suggesting with increasing independence how one variable may have affected another. Quoting relevant data as evidence of relationships. Identifying anomalies in repeat data and excluding results where appropriate. Comparing individual, class and/or model data to the prediction and recognising when they do not match. Using identified patterns to predict new values or trends.	
Evaluating	N/A	N/A		Beginning to identify steps in the method that need changing and suggest improvements. Beginning to identify which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by reflecting on: - Results that do not fit a pattern (anomalies). - The quality of results (accurate measurements and maintaining control variables). Beginning to identify new questions that would further the enquiry.		Identifying steps in the method that need changing and suggesting improvements. Identifying which variables were difficult to control and suggesting how to control them better. Commenting on the degree of trust by also reflecting on: - Accuracy (human error with equipment). - Reliability (repeating results). - Sources of information (e.g. websites, books). Posing new questions in response to the data that would extend the enquiry. Deciding what data to collect to further test direct relationships.	

Cross- curricular links

Cross-curricular links - EYFS: Reception

Prime and specific areas	Kapow Primary units EYFS - Reception			
	Animal adventures	I am a scientist - coming soon!	Our beautiful planet- coming soon!	Changing seasons
ELG: Communication and language	Listening, Attention and Understanding: Listening and responding with questions, making comments about what they have heard. Speaking: Participating in discussions, sharing ideas, using new vocabulary and explaining why things might happen.			Listening, Attention and Understanding: Listening and responding with questions, making comments about what they have heard. Speaking: Participating in discussions, sharing ideas, using new vocabulary and explaining why things might happen.
Personal, Social and Emotional development	Building Relationships: Working and playing cooperatively and taking turns with others.			Building Relationships: Working and playing cooperatively and taking turns with others.
Physical development	Gross Motor Skills: Moving energetically including running and dancing.			Fine motor skills: Using scissors.
Literacy				Writing: Labelling pictures and writing words to describe the seaside.
Mathematics	Number: Counting and subitising. Numerical Patterns: Comparing quantities up to 10, understanding greater than, less than or the same.			
Understanding the world				
Expressive arts and design	Being imaginative and expressive: Joining in with songs and moving in time to the music.			Being imaginative and expressive: Joining in with songs and moving in time to the music.

Cross- curricular links

Cross-curricular links - Year 1

National curriculum subjects	Kapow Primary units Key stage 1 - Year 1				
	Seasonal changes	Everyday materials	Sensitive bodies	Comparing animals	Introduction to plants
English	Spoken language: Presenting a weather report.	Reading: Developing pleasure in reading and new vocabulary.	Reading: Applying phonic knowledge. Writing: Segmenting to spell.	Reading: Applying phonic knowledge. Writing: Composing sentences orally before writing and re-reading to check for sense; using capital letters and full stops and the personal pronoun 'I'.	Writing: Composing sentences before writing; punctuating sentences with capital letters and full stops.
Maths	Statistics: Using tally marks to record data; completing a pictogram.		Measurement: Using connecting cubes to measure and compare lengths. Number: Counting accurately.	Number: Representing the number of pets in class using connecting cubes and recording data in a block chart; using the language less than, more than, most and fewest.	Measurement: : Using connecting cubes to compare and measure leaf length.
Art and design	Creating a season mobile; using fingerprints to create seasonal tree paintings.				Observational drawings of flowering plants.
Computing					
Geography	Locating the capital cities on the map of the United Kingdom.				Carrying out fieldwork in the school grounds.
History					Recognising the significance of scientists in the past.
Music	Listening to and joining in with songs.				Listening to and joining in with songs.

Cross- curricular links

Cross-curricular links - Year 2					
National curriculum subjects	Kapow Primary units Key stage 1 - Year 2				
	Habitats	Micro-habitats	Uses of everyday materials	Life cycles and health	Plant growth
English	Spoken language: Performing a group presentation about the life processes.	Reading: Reading a non-fiction text to find answers. Writing: Punctuating sentences with question marks; using adverbs of time.	Writing: Using co-ordination (but) when writing about objects and materials.	Reading - comprehension: Reading non-fiction to gather information.	
Maths			Measurement: Using connecting cubes to measure the length materials can stretch and the strength of paper fold bridges; using the symbol (p) for pence. Fractions: Recognising half and quarters when folding paper. Multiplication: Calculating the total cost of items by multiplying by ten.	Measurement: Using standard units to measure height. Compare and sequence intervals of time.	Measurement: Using standard units to measure stem height.
Computing	Carrying out online research into woodland animals.				
D & T				Using the basic principles of healthy and varied diet.	
Geography		Carrying out fieldwork to identify microhabitats on the school grounds.			
Music			Using their voices expressively to sing songs.		
PE				Mastering basic movements like running.	
RSE/PSHE				Knowing what constitutes healthy diet and the principles of planning healthy meals	

Cross- curricular links

Cross-curricular links - Year 3

National curriculum subjects	Kapow Primary units Key stage 2 - Year 3				
	Movement and nutrition	Forces and magnets	Rocks and soil	Light and shadows	Plant reproduction
English	Reading: Reading for information about nutrient groups and summarising as written notes. Spoken language: Articulating and justifying opinions in paired or group discussion.			Reading Reading for information about a notable person. Spoken language: Articulating and justifying opinions; presenting information using a shadow puppet to the class.	Spoken language: Articulating and justifying opinions in paired or group discussion.
Maths	Number and place value and Measurement; Measuring bone lengths and ordering them based on size; comparing nutritional values on food packaging.	Number and place value and Measurement; Measuring distance travelled by a toy car.	Statistics: Drawing a bar chart to show drainage rates for different categories of soil.	Number and place value and Measurement; Comparing values of lux using datalogging software; measuring the length of shadows.	Number and place value, Statistics and Measurement: Comparing values of data gathered from measuring plant growth; completing a bar chart.
D & T	Making a model hand with moving fingers; understanding what makes a balanced and healthy diet.				Drawing a design for seed that has different dispersal methods; selecting materials to build a model of a seed to show dispersal.
Geography				Comparing daylight/night hours in different countries.	
RSE/PSHE	Understanding what makes up a balanced and healthy diet.				

Cross- curricular links

Cross-curricular links - Year 4

National curriculum subjects	Kapow Primary units Key stage 2 - Year 4				
	<u>Digestion and food</u>	<u>Electricity and circuits</u>	<u>States of matter</u>	<u>Sound and vibrations</u>	<u>Classification and changing habitats</u>
English	Spoken language: Listening and responding in group discussion and justifying opinions; Writing - composition: explaining how animals would be affected by different teeth; writing a letter to Steve Backshall about their poo clues.	Spoken language: Asking questions and justifying answers or opinions using scientific knowledge; speculating, hypothesising, imagining and exploring ideas through spoken language while modelling circuits. Writing: Planning writing to understand and learn from vocabulary.		Reading - comprehension: Discussing their understanding of a text about how dolphins and whales use sound underwater to navigate and explaining the meaning of words in context; asking questions to improve their understanding; summarising main ideas; participating in discussion about the text. Spoken language: Taking turns and listening to what others say.	Reading - comprehension: Discussing their understanding of a text about changes over the seasons and explaining the meaning of words in context, such as hibernate and migrate; asking questions to improve their understanding; retrieving and recording information from non-fiction. Spoken language: Taking turns and listening to each of the season stories being read aloud by their peers.
Maths	Measurement: Taking measurements of time in the toothbrush investigation. Statistics: Analysing line graph trends and predicting missing values.	Geometry - properties of shapes: Recognising 2D shapes when drawing symbols and circuit diagrams.	Number and place value and Measurement: Taking temperature measurements using a thermometer.	Statistics: Interpreting and presenting discrete data using a bar chart to show the volume of different sounds. Measurement: Measuring, comparing, adding and subtracting: lengths to measure the distance sound travels at different volumes.	Statistics: Interpreting and presenting data about the characteristics of animals and plants using bar charts, pictograms and tables.
D & T		Understanding and using electrical systems when building circuits.			
Geography	Exploring animals from different habitats and their food chains.				
Music				Listening to different volume and pitch sounds with attention to detail and recalling sounds with increasing aural memory.	
RSE/PSHE	Learning about dental health and investigating dental hygiene.				

Cross- curricular links

Cross-curricular links - Year 5

National curriculum subjects	Kapow Primary units Key stage 2 - Year 5				
	Mixtures and separation	Properties and changes	Earth and space	Life cycles and reproduction	Unbalanced forces
English				Reading - comprehension: Reading non-fiction and identifying key information.	
Maths		Number and place value and Measurement; Measuring around a circular object (balloon).	Measurement: Measuring the relative distances between planets in centimeters and meters; converting between measurements of time - hours and minutes.	Measurement: Measuring the roots of a plant and converting from centimetres to millimetres. Statistics: Presenting data in a line graph; analysing data.	Measurement: Measuring the diameter of planets, the time taken for a parachute or a missile to fall and the distance a marshmallow can be catapulted. Statistics: Presenting data in a line graph; analysing data in tables and graphs; calculating the mean average.
Art and design				Drawing observational drawings of the structures in a flower.	
D & T		Measuring around a circular object (balloon) using string and a ruler.	Designing the parts of a sundial, calibrating a sundial and improving the design.		Designing the windmill of a wind-powered turbine.
Geography	Recapping the processes involved in the water cycle.				
RSE/PSHE					

Cross- curricular links

Cross-curricular links - Year 6

National curriculum subjects	Kapow Primary units Key stage 2 - Year 6				
	Classifying big and small	Light and reflection	Evolution and inheritance	Circuits, batteries and switches	Circulation and health
English	Reading - comprehension: Analysing a poem about bacteria. Writing - composition: Writing a short poem of their own about bacteria.	Spoken language: Articulating and justifying answers and opinions; developing hypothesising and imagining experimental outcomes through spoken language; considering the viewpoints of those that believe the Earth is flat and discussing the provided evidence. Writing: Planning writing by noting ideas and drawing on concepts about light and reflection to write a conclusion; summarising how mirrors are useful through creative writing or presentations.	Spoken language: Articulating and justifying answers and opinions. Reading - comprehension: Reading text about Darwin and Wallace's voyages, their observations and conclusions.	Spoken language: Articulating and justifying answers and opinions; participating in role plays to represent electrical circuits.	Spoken language: Articulating and justifying answers and opinions; participating in a role play to model the circulatory system. Reading: Researching different animal masses and evaluating the reliability of the sources. Writing: Planning their writing and using diagrams to creatively describe the journey around the circulatory system; planning a method for an enquiry by practising the process with peers to check the order and meaning of the instructions.
Maths		Measurement: Measuring and comparing lengths in a shadow investigation (cm/mm); measuring and comparing incoming and reflected angles of light. Statistics and Geometry - properties of shapes: Calculating and interpreting the mean average for the shadow investigation; interpreting and constructing reflection line graphs and using these to solve problems about missing values.	Number - addition, subtraction, multiplication and division: Comparing results when modelling natural selection. Statistics: Calculating the mean average when modelling natural selection.	Measurement: Measuring, recording and comparing lengths of different batteries(cm/mm). Statistics: Calculating the mean average when investigating bulb brightness and resistance or voltage.	Number - number and place value: Comparing animal masses and heart rates to identify a pattern. Measurement: Converting between grams and kilograms when researching animal masses. Statistics: Calculating an average mass from multiple researched values or from repeat readings during the enquiry; interpreting line graphs to describe the effects of exercise and fitness on heart rate.

Cross- curricular links

Cross-curricular links - Year 6 continued...

National curriculum subjects	Kapow Primary units Key stage 2 - Year 6				
	Classifying big and small	Light and reflection	Evolution and inheritance	Circuits, batteries and switches	Circulation and health
Art and design	Using clay to model the invertebrate groups.				
D & T		Using a net and mirrors to build a working periscope.		Using electrical circuits to build devices for a specific purpose; designing using suitable diagrams and symbols and constructing.	Understanding the principles of a healthy and varied diet when providing advice to the class or a patient case study about being healthy.
Geography			Comparing the living conditions and factors that affect survival in different habitats.		
History		Exploring the historical use of periscopes in World War I.	Comparing primary and secondary sources, their role as evidence and the degree of trust.		
PE					Participating in a physical challenge as part of an enquiry into heart rate and exercise.
RSE/PSHE					Considering mental wellbeing, physical health and fitness, healthy eating, drugs, alcohol and tobacco when advising the class or a patient case study about how to be healthy; analysing data to identify how heart rate varies with different fitness levels.