

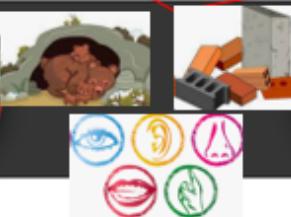
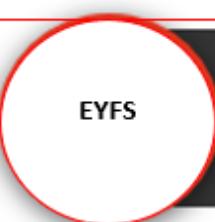
Daven Primary School: science curriculum

Roadmap

Unit overviews

Knowledge and skills mapping

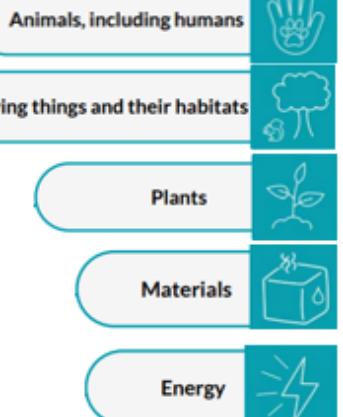
Understanding the World – learning about seasons; exploring our local area, including its habitats, animals that live around us and why. Planting seeds, learning about hibernation; exploring our senses and working with a range of materials.



Year 1



Year 2



Year 1 science

Seasonal changes; everyday materials; sensitive bodies; comparing animals; introduction to plants; and making connections.

Year 2 science

Movement and nutrition; forces and magnets; rocks and soils; light and shadows; plant reproduction; and making connections

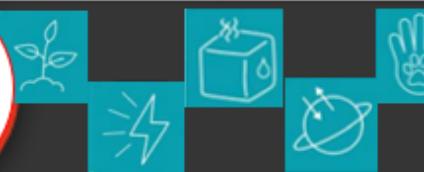
Year 3



Year 2 science

Habitats; microhabitats; use of everyday materials; life cycles and health; plant growth; and making connections.

Year 4



Year 4 science

Digestion and food; electricity and circuits; states of matter; sound and vibrations; classification and changing habitats; and making connections.

Year 5 science

Mixtures and separation; properties and change; Earth and space; life cycles and reproduction; imbalanced forces; human timeline; and making connections.

Year 6



Year 6 science

Classifying big and small; light and reflection; evolution and inheritance; circuits, batteries and switches; circulation and exercise; and making connections.

Year 5



Nursery		Reception				
Nursery 1 Explore natural materials, indoors and outside including Forest school. Explore and respond to different natural phenomena: weather, change. Etc. Notice and talk about seasonal changes. Understand how we respond to the weather and keep ourselves safe- hats, coats etc. Explore natural materials, indoors and outside. Plant care for and watch cress grow. Explore materials with different properties- natural materials, different sensations and textures etc. Look after plants.	Nursery 2 Use all their senses in hands-on exploration of natural materials – leaves, conkers, ice etc and of materials with similar/different properties. Talk about what they see, using a wide vocabulary, including seasonal change & weather. Explore how things work: wind-up toys, moving model vehicles. Explore and talk about different forces they can feel – magnets etc. Understand the key features of the life cycle of a plant & animals: hatch caterpillars etc. Plant & care for growing plants: plant cress.	Animal adventures Living and non-living (to sort objects into living and non-living). Describing minibeasts (to find and describe minibeasts). On the farm (to sort and describe farm animals). Animal homes (to sort animals based on where they live). Zoo animals (to compare my home with a zoo animal home).	Changing seasons Autumn treasures (to recognise changes outside in autumn). Whatever the weather (to recognise different types of weather). Winter wildlife (to recognise how animals prepare for winter). Springtime magic (to recognise changes outside in spring). Sandcastle science (to investigate the mixture needed to build a sandcastle).	I am a scientist Push or pull? (to explore ways to make objects move). Loud or quiet? (to explore different sounds). Float or sink? (to explore whether objects float or sink). Freeze or melt? (to explore freezing and melting). Light or dark? (to explore how light makes shadows).	Our beautiful planet Exploring outdoors (to recognise some ways to look after the planet). Plants (to identify and name plants). Exploring plant parts (to identify and name plant parts). Planting seeds (to explore what helps seeds grow). Caring for the Earth (to recognise some ways to look after the planet).	

Year 1					
Forces and space: Seasonal changes	Materials: Everyday materials	Animals: Sensitive bodies	Animals: Comparing animals	Plants: Introduction to plants	Making connections: Investigating science through stories
Wonderful weather (to identify how the weather changes across the four seasons). Seasonal changes (to identify events and activities that take place in different seasons). How do trees change? (to recognise how trees change across the four seasons). Daylight hours (to recognise that daylight hours change across the four seasons). Observing over time (to observe changes across the four seasons). Weather reports (to plan and carry out a weather report).	Naming materials (to identify everyday materials). Material detectives (to recognise the difference between objects and materials). Introduction to properties (to describe the properties of materials). Is it absorbent? (to group materials based on their properties (absorbency)). Is it waterproof? (to group materials based on their properties (waterproofness)). Is it tough? (to group materials based on their properties (toughness)).	Body parts (to name parts of the human body). The senses (to name the body parts used for each sense). Taste and touch (to identify the body parts used for the senses of taste and touch). Sight and smell (to identify the body parts used for the sense of smell and sight). Hearing (to identify the body part used for the sense of hearing). Senses in action (to recognise how the senses are used in everyday life).	Animal groups (to identify and group animals). Describing animals (to describe a variety of animals). Comparing animals (to compare the features of animals). Carnivore, herbivore or omnivore? (to identify animals that are carnivores, herbivores and omnivores). Pets (to recognise animals that make suitable pets).	What is a plant? (to identify plants in the school grounds). Parts of a plant (to identify parts of a flowering plant). Wild and garden plants (to identify and name wild and garden plants). Deciduous and evergreen trees (to identify and name deciduous and evergreen trees). Sorting seeds (to recognise that new plants come from seeds and bulbs). Which plant parts can you eat? (to recognise the importance of a scientist's role).	Do taller trees have wider trunks? (to observe changes across the seasons). Comparing woodland animals (to describe and compare the features of animals). Measuring animal footprints (to identify differences in animal features). Building an animal home (to describe the properties of everyday materials). Are birds carnivores, herbivores or omnivores? (to identify animals that are carnivores, herbivores or omnivores).

Year 2					
Living things: Habitats	Living things: Microhabitats	Materials: Use of everyday materials	Animals including humans: Life cycles and health	Plants: plant growth	Making connections: Plant-based materials
Life processes (to identify some of the characteristics of living	Identifying and classifying minibeasts (to classify a variety of	Objects and materials (to recognise that objects are made from materials	The human life cycle (to identify	What do seeds need to grow? (to recognise that seeds need certain	Reduce, reuse and recycle (to

things).	minibeasts).	that suit their uses).	different stages of the human life cycle).	conditions for growth).	describe how materials can be reused).
It feels good to be alive (to recognise the difference between things that are alive, were once alive or have never been alive).	Introduction to scientific enquiry (to recognise how scientists answer questions).	Which material is suitable? (to recognise that objects are made from materials that suit their uses).	Life cycles (to know which offspring come from which parent animal).	Seeds and bulbs (to recognise that seeds and bulbs contain what they need to grow into a plant).	From plants to products (to identify human-made and natural materials).
Introduction to habitats (to identify plants and animals in different habitats).	Minibeast hunt (to recognise that living things live in habitats to which they are suited).	Stretch it, twist it, bend it, squash it! (to recognise that the shape of some solid objects can be changed).	Growth (to observe and measure growth in humans).	Germination (to describe what seeds need to germinate).	Testing suitability (to identify suitable materials based on their properties).
Woodland habitats (to identify how a habitat provides animals and plants with what they need to survive).	Planning an experiment (to ask questions and plan how to carry out an experiment).	Testing stretchiness (to compare the suitability of materials for particular uses).	Survival (to identify and list the basic needs for survival for humans and animals).	Light and plant growth (to describe the effect of light on plant growth).	Testing plant pots (to identify a material to help plant growth).
Rainforest and ocean habitats (to recognise how animals and plants depend on each other).	Woodlice experiment (to carry out an experiment and record data in a table).	Testing strength (to recognise that the strength of some materials can be changed). Eco-friendly materials (to compare the suitability of materials for particular uses).	Exercise and hygiene (to recognise the importance of exercise and personal hygiene).	Plant life cycle (to identify stages of a plant's life cycle).	Choosing materials (to choose materials to create a suitable plant pot).
Food chains (to recall how animals get their food from plants and other animals).	What is a botanist? (to identify a variety of flowering plants).		Balanced diet (to identify how to have a balanced diet).		

Year 3

Animals: Movement and nutrition	Forces and magnets	Materials: Rocks and soil	Energy: Light and shadows	Plants: Plant reproduction	Making connections: Does hand span affect grip strength?
Skeletons (to explain the role of a skeleton).	Pushes, pulls and twists (to describe the effects of contact forces).	Rocks: Appearance (to group rocks using their appearance).	Sources of light (to explain the role of light sources).	Plant growth (to identify the growth and survival needs of plants).	Investigating grip strength – Planning (to revise the units <i>Movement and nutrition</i> and <i> Rocks and soil</i>).

Year 4

Animals including humans: Digestion and food	Energy: Electricity and circuits	Materials: States of matter	Energy: Sound and vibration	Living things: Classification and changing habitats	Making connections: How does the flow of liquids compare?
The human digestive system (to describe the function of the	Using electricity (to recognise how electrical appliances are powered).	Solids (to identify solids using their properties).	Vibrations (to describe how sounds are made).	Grouping living things: Vertebrates and invertebrates (to group	Investigating liquids – Planning (to revise the units <i>States of</i>

human digestive system). Human teeth (to recognise the different types of human teeth and their roles in eating). Investigating dental hygiene (to explain how to care for our teeth). Teeth of carnivores, herbivores and omnivores (to recognise that differences in teeth relate to an animal's diet). Producers, predators and prey in food chains (to recognise producers, predators and prey in food chains). Poo clues (to recognise that animal poo can give us clues about digestion, teeth and diet).	electrical circuit). Switching on and off (to explain the use of switches in a circuit). Investigating electrical conductors and insulators (to explain the use of materials as electrical conductors or insulators). Investigating bulb brightness (to investigate what affects bulb brightness). Electrical safety (to explain how to be safe around electricity).	and gases using their properties). Melting and freezing (to describe melting and freezing). Condensing and evaporating (to describe condensing and evaporating). The water cycle (to describe the different stages of the water cycle). Climate change and the water cycle (to describe how temperature affects evaporation rates and the water cycle).	sounds are heard through different mediums). Volume (to describe the relationship between vibration strength and volume). Volume and distance (to describe the relationship between volume and distance). Pitch (to describe pitch and how to change it). Sound insulation (to explain how insulating materials can be used to muffle sounds).	animals in various ways). Grouping living things: Plants (to group plants in various ways). Classification keys (to make careful observations). Habitats and seasonal change (to recognise and describe different habitats and their inhabitants). Human impacts on habitats (to recognise the impact humans can have on habitats). Natural changes to habitats (to recognise the impact of natural disasters on habitats).	matter and <i>Classification and changing habitats</i>). Investigating liquids – Gathering data (to revise the unit <i>Electricity and circuits</i>). Investigating liquids – Analysing, concluding and evaluating (to revise the units <i>States of matter</i> and <i>Sound and vibrations</i>). Investigating liquids – Extending (to revise the unit <i>Digestion and food</i>). Investigating liquids – Presenting (to revise the unit <i>State of matter</i>).
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Year 5

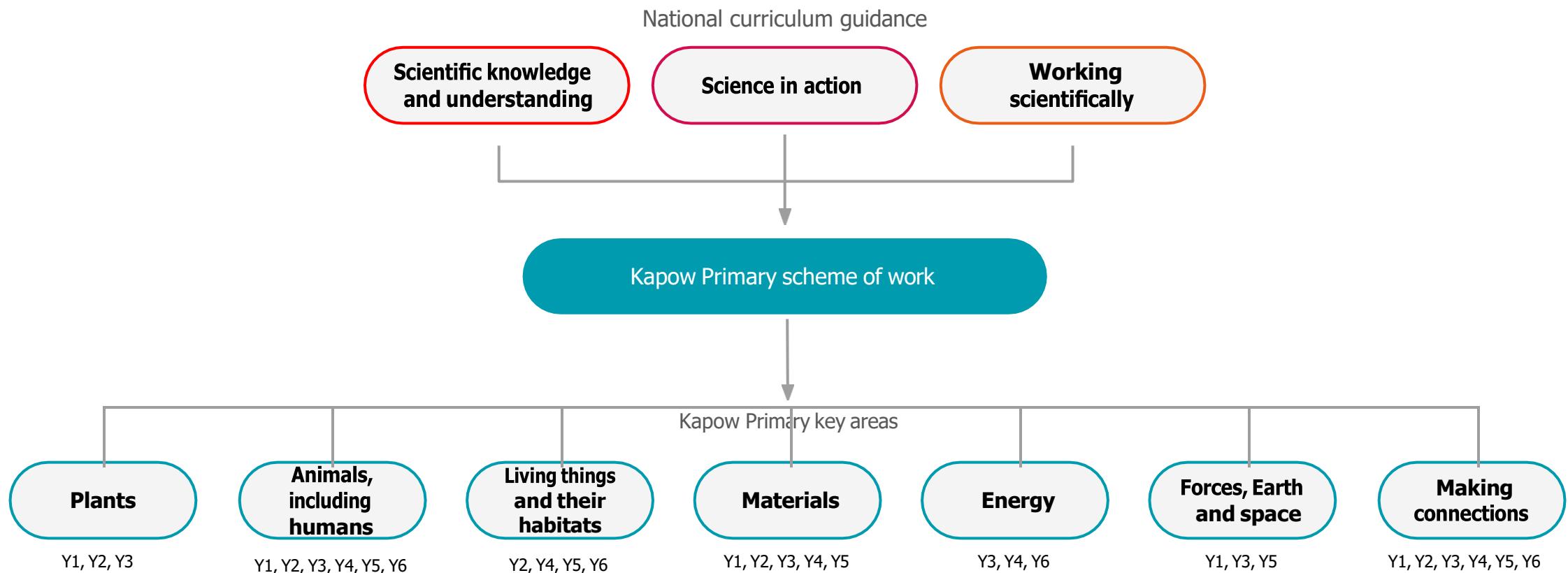
Materials: Mixtures and separation Mixtures (to describe mixtures). Sieving (to explain the process of sieving). Filtering (to explain the process of filtering). Solutions (to describe solutions and how they can be identified). Dissolving (to identify which factors affect the time taken to dissolve). Evaporating (to describe the process of evaporation).	Materials: Properties and change Hardness (to determine the hardness of materials and link this to their uses). Transparency (to determine the transparency of different materials and link this to their uses). Conductivity (to determine the conductivity of different materials and link this to their uses). Reversible changes (to demonstrate reversible changes). Irreversible changes: Burning and rusting (to demonstrate irreversible changes). Irreversible changes: Mixing (to demonstrate irreversible changes).	Forces and space: Earth and space Models of our Solar System (to compare the contributions of Ptolemy, Alhazen and Copernicus to models of the Solar System). Our Solar System (to describe the movement and shapes of the celestial bodies in our Solar System). The Moon (to describe the movement of the Moon relative to the Earth). Day and night (to explain the causes of day and night and the seasons). Time (to devise a sundial to tell the time). Satellites and space junk (to describe some uses of satellites and the problems posed by space junk).	Living things: Life cycles and reproduction Life cycles and reproduction in plants (to describe the life cycle of a plant, including the reproductive stage). Life cycle of a mammal (to describe the life cycle of a mammal). Life cycle of a bird (to describe the life cycle of a bird and compare it with that of a mammal). Life cycle of an amphibian (to describe the life cycle of an amphibian). Life cycle of an insect (to describe the life cycle of an insect and compare it with that of an amphibian). Asexual reproduction in plants (to describe asexual reproduction in plants).	Forces and space: Unbalanced forces Gravity (to describe gravity and its effects). Air resistance (to describe air resistance and its effects). Water resistance (to describe water resistance and its effects). Friction (to describe friction and its effects). Levers, pulleys and gears (Part 1) (to describe the effects of levers, pulleys and simple machines on movement). Levers, pulleys and gear (Part 2) (to describe the relationship between lever length and effort).	Animals: Human timeline Growing old (to describe how humans change from babies through old age). Puberty (to identify changes in males and females as a result of puberty). Comparing human gestation (to explore the gestation periods of humans and other animals). Making connections: Does the size of an asteroid affect the diameter of its impact crater? Investigating asteroid craters – Planning (to revise units <i>Earth and space</i> and <i>Life cycles and reproduction</i>). Investigating asteroid craters – Gathering data (to revise units <i>Unbalanced forces</i> and <i>Mixtures and separation</i>). Investigating asteroids – Analysing, concluding and evaluating (to revise the units <i>Separating mixtures</i> and <i>Unbalanced forces</i>).
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Year 6

Living things: Classifying big and	Energy: Light and reflection	Living things: Evolution and	Energy: Circuits, batteries and	Animals including humans:	Making connections: Are some
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small		inheritance	switches	Circulation and health	sunglasses safer than others?
<p>Carl Linnaeus and classification (to explain how organisms are classified using the Linnaean system).</p> <p>Cold-blooded vertebrates (to classify the cold-blooded vertebrate groups using their common characteristics).</p> <p>Warm-blooded vertebrates (to classify the warm-blooded vertebrate groups using their common characteristics).</p> <p>Invertebrates (to classify invertebrates using their characteristics).</p> <p>Plants (to describe how the plant kingdom is organised, based on shared characteristics).</p> <p>Micro-organisms (to describe and classify micro-organisms).</p>	<p>The pathway of light (to describe the pathway of light).</p> <p>See the light (to describe how we see).</p> <p>Measuring shadows (to explain how shadows change).</p> <p>Reflecting light (to investigate what affects the angle of the reflected ray).</p> <p>Making a periscope (to explain how a periscope works).</p> <p>Using mirrors (to explain how mirrors are helpful).</p>	<p>Variation (to explain why there are differences within a species).</p> <p>Inheritance (to recognise the inheritance of characteristics in plants and animals).</p> <p>Adaptations (to explain why adaptation is necessary).</p> <p>Modelling natural selection (to model how natural selection affects population size).</p> <p>Evolution (to describe the theory of evolution).</p> <p>Evidence for evolution (to recognise evidence that can be used for evolution).</p>	<p>Components and circuits (to use recognized symbols for electrical components).</p> <p>Circuit diagrams (to predict and present results for electrical circuits).</p> <p>Current and resistance (to recognise a link between the number of components and resistance).</p> <p>Batteries and voltage (to identify ways to change voltage within an electrical circuit).</p> <p>Voltage and bulb brightness (to investigate how voltage affects bulb brightness).</p> <p>Practical circuits (to apply knowledge of circuits and components to a practical solution).</p>	<p>Factors affecting health (to identify factors that affect our health and how to reduce their negative impact).</p> <p>The heart and circulatory system (to summarise the key structures and purpose of the circulatory system).</p> <p>Blood (to identify the key roles of blood).</p> <p>Heart rate (to explore the relationship between animal size and heart rate).</p> <p>Investigating exercise and heart rate (to investigate the relationship between exercise and heart rate).</p> <p>Heart rate and fitness (to describe the relationship between heart rate and fitness).</p>	<p>Investigating sunglasses – Planning (to revise the units <i>Circulation and health</i> and <i>Light and reflection</i>).</p> <p>Investigating sunglasses – Gathering data (to revise the units <i>Light and reflection</i> and <i>Circuits, batteries and switches</i>).</p> <p>Investigating sunglasses – Analysing, concluding and evaluating (to revise the units <i>Light and reflection</i> and <i>Circulation and health</i>).</p> <p>Investigating sunglasses – Extending (to revise the units <i>Classifying big and small</i>, <i>Evolution and inheritance</i>, <i>Light and reflection</i> and <i>Circulation and health</i>).</p> <p>Investigating sunglasses – Presenting (to revise the units <i>Light and reflection</i> and <i>Circulation and health</i>).</p>

How is the science scheme of work organised?



		EYFS: Reception Our beautiful planet	Year 1 Introduction to plants	Year 2 Plant growth	Year 3 Plant reproduction
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.
		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.
		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.

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

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

		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		<p>To know that 'organism' is a term used to refer to an individual living thing.</p> <p>To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye.</p> <p>To know the characteristics of the different groups of vertebrates and commonly found invertebrates.</p>
	Variation and inheritance	<p>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.</p> <p>To know that all living things must reproduce for the species to survive.</p> <p>To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent.</p> <p>To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).</p>	<p>To know that living things have changed over time.</p> <p>To know that fossils provide us with information about living things that inhabited the Earth millions of years ago.</p> <p>To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents.</p> <p>To know that over time, variation in offspring can affect animals' chances of survival in particular environments.</p>
	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 <u>I am a scientist</u>	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		<p>To know that objects are items or things.</p> <p>To know that a material is what an object is made from.</p> <p>To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</p>		<p>To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.)</p> <p>To know that rocks may contain grains, crystals or fossils.</p> <p>To know that grains and crystals appear differently and can be used to classify rocks.</p> <p>To know that soils are made from rocks and dead matter.</p>
	Properties and uses	To know objects float or sink.	<p>To know that property refers to how a material can be described.</p> <p>To describe the physical properties of a variety of everyday materials.</p> <p>To understand that materials can be grouped based on their physical properties.</p>	<p>To know why objects are made from particular materials and to give examples of their suitability.</p> <p>To know that one material can be used for a range of purposes (and to give examples.)</p> <p>To know that different materials can be used for the same purpose (and to give examples.)</p> <p>To know why certain materials are unsuitable for particular objects.</p>	<p>To understand the relationship between the properties of rocks and their uses.</p>
	Change	<p>To know some objects move when pushed or pulled.</p> <p>To know some objects freeze or melt.</p>		<p>To know that a push or pull must be applied to change the shape of a solid object.</p> <p>To know that solid objects can be squashed, bent, twisted or stretched.</p> <p>To know that different solid objects may take a different amount of force to change shape.</p>	<p>To know that fossils can form from the remains of living things.</p> <p>To know that rocks can change over time (e.g. erosion, weathering).</p>

		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	<p>To know that a property of a solid is that it keeps its shape unless a force is applied to it.</p> <p>To know that a property of a liquid can flow freely and take on the shape of a container.</p> <p>To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.</p>	<p>To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.</p>
	Change	<p>To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating).</p> <p>To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).</p> <p>To know that water can exist as a solid, a liquid or a gas.</p> <p>To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.</p> <p>To know that water flows around the world in a continuous process called the water cycle.</p> <p>To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour.</p> <p>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.</p> <p>To know that the rate of evaporation increases as temperature rises.</p>	<p>To know that some substances will dissolve in a liquid to form a solution.</p> <p>To know the factors that affect the time taken to dissolve, including temperature and stirring.</p> <p>To understand that dissolving, mixing and changes of state are reversible changes.</p> <p>To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes.</p> <p>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.)</p>

		Light		
		EYFS: Reception <u>I am a scientist</u>	Year 3 <u>Light and shadows</u>	Year 6 <u>Light and reflection</u>
Scientific knowledge and understanding	Sources	To know day is light because the sun is in the sky. To know night is dark because the sun is not in the sky.	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.
	Transfer	To know that shadows are created when something blocks the light.	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.
	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.

		Sound	
EYFS: Reception <u>I am a scientist</u>		Year 4 <u>Sound and vibrations</u>	
Scientific knowledge and understanding	Sources	To understand that sound is a result of vibrations.	
	Transfer	<p>To know that vibrations from sounds travel through mediums to the ear.</p> <p>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.</p> <p>To know that different materials provide different amounts of insulation against sound.</p>	
	Factors affecting energy	<p>To know about differences in sounds.</p> <p>To know a variety of ways to change the pitch or volume of a sound.</p> <p>To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.</p> <p>To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.</p> <p>To know that sounds get fainter as the distance from the sound source increases.</p>	

		Electricity	
		Year 4 <u>Electricity and circuits</u>	Year 6 <u>Circuits, batteries and switches</u>
Scientific knowledge and understanding	Sources	<p>To know that all electrical appliances need a power source, including batteries or mains electricity.</p> <p>To know that an electrical circuit needs a complete path for the electrical charge to flow through.</p> <p>To know the main components in a simple series circuit.</p> <p>To know the precautions for working safely with electricity.</p>	<p>To know a wider variety of components in a series circuit (including buzzer and motor).</p> <p>To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.</p>
	Transfer	<p>To know that some materials allow electrical charge to pass through them quickly and these are known as electrical conductors (e.g. metals).</p> <p>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).</p> <p>To know that metals are used for cables and wires because they are good conductors of electricity.</p> <p>To know that plastic is used to cover cables and wires because it is a good insulator.</p>	
	Factors affecting energy	<p>To understand that an open switch breaks a series circuit so the components will be off.</p> <p>To understand that a closed switch completes a series circuit so the components will be on.</p> <p>To understand the relationship between bulb brightness and the number of bulbs in a circuit.</p>	<p>To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).</p>

		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.
		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.

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

	EYFS: Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Posing questions	Asking questions about the natural world with support.	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, when working practically.	Beginning to recognise whether a test is fair. Deciding if suggested observations are suitable, with support. 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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. 	

	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)	N/A	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: <ul style="list-style-type: none">Using some standard symbols.Drawing in 2D to produce simple line diagrams.Labelling with more scientific vocabulary.		Drawing scientific diagrams by: <ul style="list-style-type: none">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: <ul style="list-style-type: none">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	Grouping objects, plants and animals with support.	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.	

	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: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• 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.	

EYFS: Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
To know some different job roles.	To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. To know about science in the news and recent discoveries. To know there are spiritual, moral, social and cultural links with Science.					
			To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. To know how scientific knowledge has changed over time, leading to the current understanding of Science. To know about current scientific research and what it aims to achieve in the future. To know that collaboration and peer reviewing is essential for effective scientific progress.			
					To know how scientific evidence is used to support or refute ideas or arguments. To know that mistakes can lead to new discoveries.	

