Tonwell St Mary's School Curriculum Overview of Intent for Science

Overall aims:

We aim to give all our children a broad and balanced Science Curriculum, to confidently explore and enquire about the world around them and ultimately have a better knowledge and understanding of the world we live in. We recognise the importance of Science in everyday life and therefore give the teaching and learning of science the prominence it requires. In order to develop a love and respect for Science we create exciting, practical, hands on experiences which are set out in our curriculum intent below. We intend to provide children with these stimulating experiences, so that they ultimately know more and remember more and develop their knowledge and understanding sequentially over time. We not only aim to meet the statutory requirements of the Science National Curriculum, but we also aim to provide children with an understanding of the implications of their science knowledge now and for the future and a respect for living organisms and the world we live in. We want our children to believe they can do anything and prepare them to become the next STEM leaders in our community.

Our unique context:

Due to the unique context of our school with mixed-age classes and rolling programmes of study, we have organised our curriculum for science in the following ways:

Our Early Years children have the opportunity to explore and investigate the world around them. Children take part in both child and adult led scientific learning throughout the year, linking to 'Understanding the World' within the Early Years Framework. Teachers set out 'non-negotiable' knowledge that is taught throughout the year, to ensure children enter year 1 with the prior knowledge and skills required to prepare them for the National Curriculum. Teachers also understand the importance of following the children's interests as a way to spark curiosity and promote a love for Science.

We follow the national curriculum for science in Years 1-6 and utilise the programmes of study for each year group to differentiate knowledge and skills. Within each topic children will access a minimum of 2 hands on, practical investigations which will build upon their prior knowledge and understanding, ultimately leading to an investigation to end the topic which will answer the key question, wherever appropriate. We place heavy emphasis on building and developing enquiry skills by using visual prompts throughout each lesson, which every child can access. Due to our mixed-age classes, the learning set out in KS2 has been carefully sequenced to ensure topics are revisited either annually or biannually, so children are able to build their knowledge and understanding over time, making links and connections to learning which has taken place in previous years. Forest School and the EYFS outside area is also utilised to support science learning, particularly with biology, so children can experience practical, first-hand experiences.

	Autumn Term		Spring Term		Summer Term	
EYFS Years A & B	**All about me.** What do I notice about Autumn? How am I unique?	**Celebrations**. What do I notice about winter? What happens	**Ticket to ride!** Can I explore pushing and pulling? Can I explore other forces e.g. magnets,	**Come outside.** What do I notice about spring? Where do minibeasts live? What minibeasts live in this country and why? (Habitats)	**Traditional Tales.** Materials (link to 3 little pigs houses,	**When I grow up/Summertime** What floats and what sinks? (Linked to the

	How can we stay fit and healthy?	to different foods when I put them in the oven?	wind resistance, water resistance?	How can I look after our chicks? What is the life cycle of chicks/minibeasts? What is the life cycle of a plant? What do plants need to survive? What are the seasons? How does weather change?	porridge for goldilocks, bread for the little red hen). What different materials do I know? What are the properties of materials? How can I change materials?	beach). What do I notice about Summer? How do Doctors help people? How do firefighters put out fires? Are fingerprints unique?
	Body, body parts, healthy, food, balanced, diet, food groups, exercise, washing, water, toothbrush, mind.	Winter, leaves, falling, cold weather, frost, snow, rain, changes, food, oven, heat.	Winter, leaves, falling, cold weather, frost, snow, rain, changes, push, pull, move, force, wind, water, resistance.	Seasons, change, Spring, Summer, Autumn, Winter, life-cycle, growth, eggs, hatch, incubate, habitat, stage, same, different, country, hot, cold.	Materials, change, different, same, properties (transparent, rigid, smooth etc.), mix, heat, cook.	Float, sink, gravity, surface area, weight, water, up, down, heavy, light/
KS1 Year A	**Animals including humans** Do the tallest children have the biggest feet?	**Materials** What is the best material for the 3 pigs' homes?	**Animals including humans/Living things and habitats** What animals live in the North Pole compare to in the UK?	**Animals including humans** Can I design my own healthy packed lunch? **Investigation: Design and make a healthy packed lunch.**	**Living things and habitats** What is the best environment in school for minibeasts to live?	**Plants** Can I name and classify plants and trees? Can I identify the parts of a plant and tree? **Investigation: Name and classify the trees**

	Investigation: Measuring their own and their peers feet and forming a conclusion.	**Investigation: Making their own house for the 3 little pigs, giving reasons for their choice.**	**Investigation: classify a range of animals that live in the North Pole.**		**Investigation: Design and make a habitat for a specific minibeast.**	**in Tonwell during a fieldwork exercise.**
	Growth, birth, death, limbs, muscle, results, bones skeleton, life cycle, living, alive, dead, never alive, senses, smell, taste, sight, touch, sound. **Note:** include Human body and the Human life cycle	**Materials,** brick, straw, sticks, paper, fabrics, elastic, foil, properties, wood, plastic, glass, metal, water, rock, same, different, hard, soft, strong, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent.	Fish, amphibian, reptiles, birds, mammals, carnivores, herbivores, omnivores, polar bear, seal, walrus, whales, seabirds, arctic hare, arctic fox, pigeon, fox, hare, rabbit, fish (common fish in the river lea), habitat.	Health, nutrients, nutrition, protein, carbohydrate, roughage, vitamins, sweet, savoury, taste, energy.	Habitat**,** insects, spiders, woodlice, invertebrates, food chain, shelter, micro-habitat, microhabitat, environment.	Deciduous, evergreen, leaves, flowers, petals, fruit, roots, bulb, seed, trunk, branches, stem, fruit, berries, changed, grow, environment, habitat.
KS1 Year B	**Living things and habitats**	**Animals including humans**	**Materials** What is the most suitable material for an umbrella?	**Materials** What is the best material to make a boat to cross the moat?	**Plants** What do plants need to grow well?	

	What is the food chain in our local area? **Investigation: Carry out a wildlife walk and create a food chain for our local area.** Link to history/geography topic.	Why is it important for us to exercise? **Investigation: Explore how our heart rate changes before and after exercise.**	**Investigation: Design and make an umbrella and test it.**	**Investigation: Design and make a boat and test it.**	**Investigation: Plan, set up and carry out an experiment to find out what plants need to grow well. Write up a conclusion.**
	Wet, dry, waterproof, soggy, damp, fabric, wool, plastic, cotton, material, suitable, properties, same, different,	Health, fitness, heart-rate, muscles, regular exercise, breathe, stamina, strength, **energy.**	Energy, Food, Organism, Ecology, Nutrients, Ecosystem, Consumer, Producer, fish, amphibians, reptiles, birds, mammals, omnivores, carnivores, herbivores.	Float, sink, light, water, heavy, wood, rock, waterproof, fabric, **material.**	Light, sunlight, soil, rain, water, seed, stem, flower, leaf, photosynthesis, germination, survival, reproduction, energy, environment, habitat, grow.

KS2 Year A	**Rocks** Which Rock is the hardest/most durable? **Investigation: How many drops of water will soak into the rock/rock scratch test.**	**Animals including humans** How does exercise affect your heart rate? **Investigation: How do different exercises affect our heart rate?**	**Forces** What are magnets and how do they work? **Investigation: How do magnets attract and repel?**	**Plants** How does light affect growing plants and how do plants keep growing? **Investigation: Grow plants with varying amounts of light.**	**Light** How do shadow puppets work? **Investigation: Create your own shadow puppet show.**

	Rocks, physical properties, fossils, soils, organic matter, hard, soft, durable, not durable, similarities, differences.	Exercise, healthy, fit, heart rate, bodies.	Magnets, attract, repel, forces, contact, magnetic force, surfaces, poles, strength.	Roots, stem, trunk, leaves, flowers, life, growth, requirements, air, light, nutrients, water, flowering, pollination, seed formation and seed dispersal.	Light, shadow, see, absence of light, dark, reflected, dangerous, protect, opaque, non-opaque.

KS2 Year B	**Living things and their habitats** How can I use classification keys to explore and group the animals in our local area? **Investigation: Create a classification key for Tonwell.** Note: include positive and negative human impacts on the local environment in this unit.	**Animals including humans** Can I create my own food chain for the animals in our local area? **Investigation: Create a food chain for Tonwell.**	**Electricity** How do switches work? **Investigation: Make a circuit with a home made switch.**	**Sound** How do musical instruments make sound? **Investigation: Make a musical instrument using elastic bands to experiment with pitch.**	**States of matter** How does the water cycle work? **Investigation: Explore how different amounts of water/water in different places evaporates.**	**Animals including Humans** How does food travel through our body? **Investigation: Create a diagram of the digestive system/teeth.** Note: include teeth within this unit.
	Classification, key, vertebrate, invertebrate, mammal, birds, reptile, fish, amphibian, life cycle, reproduce, group.	Food chains, producers, predators, prey, carnivores, herbivores, animals, mammals, amphibians, reptiles, birds, fish.	Electricity, **circuit,** battery, switch, cells, wires, bulbs, buzzers, voltage, amp, conductor, insulator, series, parallel, brightness, light source, reflect, shadow, transparent, opaque, surface, beam, mirrors, travel	Sounds, vibrate, medium, ear, pitch, volume, fainter, distance, sound source, musical instruments.	Solids, liquids, gases, evaporation, condensation, melting, temperature, water-cycle, heating, cooled, particles, reversible, irreversible, dissolve,	Digestive system, mouth, tongue, teeth, oesophagus, stomach, small and large intestine, incisors, canines, premolars, molars.

					solution, thermometer.	

KS2 Year C	**Earth and Space** Does the Earth move? **Investigation: Create a to scale model of the solar system.**	**Living things and their Habitats (Link to amazon)** Can I group and classify the animals that live in the amazon? How are they different to the animals that live in the UK? **Investigation: Create and use classification keys.**	**Animals including humans** How does our circulatory system work and how does it change/function when we exercise? **Investigation: Create a fact file on our circulatory system.** Note: include how drugs and other substances can harm the body	**Light** How does the distance from the light source affect the size of the shadow? **Investigation: how does the distance from the light source affect the size of the shadow?**	**Forces (Gravity, air, water, friction, levers, pulleys, gears)** What can affect how things move? **Investigation: Range of investigations throughout to answer the key question.**

	Earth, planet, sun, solar system, moon, movement, spherical, rotation, axis, orbit, international space station, day and night, sky, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, celestial, safety, glasses, direct, time, sundial, shadow clock.	Classification, groupings, micro-organisms, vertebrates, invertebrates, fish, amphibians, reptiles, birds, mammals, insects.	Circulatory system, heart, blood, blood vessels, diet, exercise, drugs, lifestyle, bodies, function, nutrients, water, healthy, damage.	Light, travel, reflect, retroreflective, eye, light source, shadow, shape, cast, brightness.	Gravity, air resistance, water resistance, friction, surfaces, levers, pulleys, gears, fast, slow.
KS2 Year D	**Electricity** How does the voltage/number of cells affect the brightness of the bulb or loudness of the buzzer? **Investigation: Create your own circuit with either the brightest bulb or loudest buzzer.** Note: prior knowledge from Year B electricity may need to be addressed	**Properties and changes of materials** What are reversible and irreversible changes? **Investigation: Range of investigations throughout to answer the key question.**		**Living things and their habitats** How do the life cycles of animals differ? What is the life process of reproduction and why is it important?	**Evolution and inheritance/animals including humans** How can changes in animals affect their ability to survive? What happens to humans as they develop to old age?
	Electricity, circuit, battery, switch, cells, wires, bulbs, buzzers, voltage, amp, conductor, insulator, series, motor, symbols.	Solids, liquids, gases, evaporation, condensation, melting, temperature, water-cycle, heating, cooled, particles, reversible, irreversible, dissolve, solution, thermometer.		Life cycle, mammal, amphibian, insect, bird, death, decay, reproduction, sexual, asexual.	Fossils, offspring, identical, vary, adapt, evolution, baby, toddler, child, teenager, adult, old age, death.

Scientific Skills Ladder

	EYFS	Year 1/2	Year 3/4	Year 5/6
Asking questions and making predictions	Ask and answer simple questions about the natural world around them	Ask simple questions and recognise they can be answered in different ways Explore the world and develop ability to ask questions (such as what something is, how things are similar and different, how things work, how things change and how they happen. Begin to make predictions based upon their knowledge.	Ask relevant questions and use different types of scientific enquiries to answer them Consider prior knowledge when asking questions Independently use a range of question stems and where appropriate, answer these questions. Given a range of resources, children decide how to gather evidence to answer the questions Recognise when secondary sources can be used to answer questions that cannot be answered through practical work Begin to identify the type of enquiry they have chosen to answer the question Make predictions based upon their subject knowledge	Independently ask scientific questions Decide how to gather evidence to answer a scientific questions Choose a type of enquiry to carry out and justify their choice Make predictions based upon their subject knowledge and justify their choice
Setting up tests	Perform simple tests set up by the teacher	Perform simple tests by using practical resources to gather evidence to answer questions asked by themselves or the teacher.	Set up simple practical enquiries, comparative and fair tests. Select from a range of resources. Make a follow a plan to carry out: observations and test to classify; comparative and simple fair tests;	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables when necessary

		Carry out tests so classify; comparative tests; pattern seeking enquiries and make observations over time.	observations over time; and pattern seeking.	Select from a range of practical resources Carry out fair tests, recognising and controlling variables Decide what observations or measurements to take over time and for how long.
Observing and Measuring	Observe closely using magnifying glasses and their five senses Take measurements using non-standard units	Observe closely using simple equipment such as magnifying glasses and digital microscopes to make observations. Take measurements, initially by comparison and then by using non-standard units.	Make systematic and careful observations Use a range of equipment for measuring length, time, temperature and capacity using standard measurements.	Select measuring equipment to give the most precise results During an enquiry children make decisions about whether they need to repeat, increase the sample size, adjust the observation period and frequency or check secondary sources to get accurate data.
Recording data	Record observations using photographs, videos, drawings and visual prompts Discuss what they have observed with a peer or adult Explore sorting using physical objects and prompts	Record observations by using photographs, videos, drawings, labelled diagrams or in writing. Record measurements by using prepared tables, pictograms and tally chats. Classify using simple prepared tables and sorting rings.	Record observations using photographs, videos, pictures, labelled diagrams or writing. Record measurements using tables, tally chats and bar charts. Record classifications using tables, Venn diagrams and Carroll diagrams. Present the same diagrams in a variety of ways. Begin to decide how to record and present evidence.	Record observations using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. Record measurements using tables, tally charts, bar charts, line graphs and scatter graphs. Record classifications using tables, Venn diagrams, Carroll diagrams and classification keys. Decide how to record and present evidence, including presenting evidence in a variety of ways.

Interpreting and presenting results	Use experiences to suggest appropriate answers to questions Draw simple conclusions and discuss with peers or adult	Use their experiences and evidence to suggest appropriate answers to questions. Use secondary sources (e.g. identification sheets). Draw conclusions and recognise 'biggest and smallest', 'best and worst' from their data.	Begin to decide how to record and present evidence. Answer their own and other's questions based on observations, measurements and information from secondary sources. Answers are consistent with evidence. Interpret data to generate simple comparative statements based upon evidence. Identify naturally occurring patterns and casual relationships. Draw conclusions based on their evidence and current subject knowledge.	Decide how to record and present evidence, including presenting the same information in a variety of ways. Look for patterns and relationships using a suitable sample Discuss whether secondary sources supports or refutes their answers. Talk about how their scientific ideas have changed. Identify casual relationships and patterns in the natural world. Identify results that do not fit the overall pattern. Explain their findings using their subject knowledge.
Evaluating and raising further questions		Use results to decide if there are any further questions with the support of a teacher. Use results to discuss variations on tests with the support of a teacher.	Identify ways in which the method was adapted as they progressed or how they might do things differently if they repeated the test.	Evaluate the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. Identify any limitations related to their data.

Knowledge Ladder

	EYFS	Year 1/2	Years 3/4	Years 5/6
What do I notice about Autumn? How am I unique? How can we stay fit and healthy?	Know some key signs of Autumn e.g. leaves falling, leaves turning yellow, orange, red, conkers, pine cones and observe changes in weather. Know that everybody is different, and we all have different/unique features e.g. hair colour, eye colour and like different things. Know that we need to have a balanced diet, water,			

	exercise, sleep and brush our teeth to stay healthy. Know that keeping our mind healthy is as important as keeping our body healthy.			
What do I notice about Winter? What happens to different foods when I put them in the oven?	Know some key signs of Winter, e.g. frost, colder weather, bare trees and observe changes in weather. Observe decay and changes over time. Know about and observe changes to different ingredients when making bread, gingerbread people and more.			
What do I notice about winter? Can I explore pulling and pushing?	Know some key signs of Winter, e.g. frost, colder weather, bare trees and observe changes in weather. Observe decay and changes over time. Know that we can push/pull objects and alter their position to affect how fast they can travel. Know that there are other things that can affect how fast things can travel e.g. if its in the air, if its in the water.			

What do I notice about Spring? Where do animals live? What animals live in this country and why? Can I look after the chicks? What do plants need to survive? What is the life cycle of a plant/animal? **(2 year rolling cycle)**	Know some key signs of Spring, e.g., blossom, flowers, warmer weather, green leaves and observe changes in weather. Know about and observe animals that live in the outside area, e.g. birds, minibeasts. Compare and contrast the animals we have found in our outside area to animals in other countries (spiders, snails and beetles) Observe and talk about the changes we see in our chicks (growing, feathers, eating) Talk about how we can care for the chicks. Know some things plants need to survive (water, sunlight and possibly space, right temperature, time, air and nutrients) Know that there is something called a life cycle and this is what happens to a plant or animal in its lifetime.			

What can I do to change materials?	Know that we can use heat, water, the fridge/freezer and more to change materials (exploring metal, plastic, wood, paper and more) Know that we can use language such as transparent, hard, soft, smooth, rough, rigid, flexible, bendy, opaque and more to describe materials. Know and observe changing states of matter e.g. water freezing and melting.			
What floats and sinks? **What do I notice about summer?**	Know some key signs of summer, e.g. plants growing, green plants, warmer weather and observe changes in the weather. Know that sinking means an object falls to the bottom of the water. Know that floating means the object stays on top of the water. Know that some objects float and some objects sink. Explore changing objects to make them float/sink.			

Do the tallest children have the biggest feet?		Identify, name, draw and label the basic parts of the human body (head, ears, eyes, nose, mouth, arms, hands, fingers, stomach, legs, feet, toes, back, neck, elbow, knee, ankle) and say which part of the body is associated with each sense. Notice that animals, including humans, have offspring which grow into adults	Identify that human's and some other animals have skeletons and muscles for support, protection, and movement. Identify, name, draw and label some parts of the skeleton (skull, spine, patella, ribs)	
What is the best material for the 3 little pig's homes?		Distinguish between an object and the material from which it is made (e.g. a table is made from wood, a water bottle is made from plastic) Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Describe the simple physical properties of a variety of everyday materials	Compare and group together different kinds of rocks (marble, fint, sandstone, limestone, obsidian) on the basis of their appearance and simple physical properties. Recognise that soils (silty soil, loamy soil, clay soil, peaty soil, sandy soil) are made from rocks and organic matter.	

		Compare and group together a variety of everyday materials on the basis of their simple physical properties. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.		
What animals live in the North Pole?		Identify and name a variety of common animals (fish, amphibians, mammals, reptiles and birds) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe the structure of a range of common animals.	Describe how animals obtain their food from plants and other animals, using the idea of a food chain (consolidation from previous years).	
Can I design my own healthy packed lunch?		Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.	

What is the best environment in school for minibeasts to live?		Explore and compare the differences between things that are living, dead, and things that have never been alive (pencil, tables, feathers, range of animals, extinct animals e.g. dodo, fossils, plastic objects) Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other (range of ocean animals, desert animals and jungle animals) Identify and name a variety of plants and animals in their habitats, including microhabitats (minibeasts around the school ground e.g. worms, woodlouse, spiders)	(Y4) Recognise that environments can change and that this can sometimes pose dangers to living things	
Can I name and classify plants and trees?		Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees around the school grounds.	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	

		Identify and describe the basic structure of a variety of common flowering plants, including trees (trunk, bark, roots, leaves, crown, stem, petal) Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Investigate the way in which water is transported within plants (Y4) Recognise that living things can be grouped in a variety of ways	
What is the food chain in our local area?		Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. (plankton, fish, seal and whale and grass, snail, rabbit and bird) Explore the animals in our local area and create a food chain to represent this.	Describe how animals obtain their food from plants and other animals, using the idea of a food web. Explore the animals in our local area and create a food web to represent this.	
Why is it important for us to exercise?		Identify, name, draw and label the basic parts of the human body (head, ears, eyes, nose, mouth, arms, hands, fingers, stomach/tummy, legs, feet, toes, back, neck, elbow, knee, ankle)	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Identify, name, draw and label some parts of the	

		Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	skeleton (ribs, skull, spine, patella)	
What is the most suitable material for an umbrella?		Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Distinguish between an object and the material from which it is made Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials (water, ice, chocolate) change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius.	

What is the best material to make a boat to cross the moat?		Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Distinguish between an object and the material from which it is made Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Recognise that soils are made from rocks and organic matter	
What do plants need to grow well?		Identify and name a variety of common wild and garden plants, (sunflower, evergreen and deciduous trees in the school ground,	Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow)	

		weeds in the school ground, marigold) including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees (stem, leaf, petal, roots, trunk, branches, twig crown) Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	and how they vary from plant to plant (pollen and anther)	
Which rock is the hardest/most durable?		Distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties	Compare and group together different kinds of rocks (igneous, metamorphic and sedimentary) on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years Find out about the work of palaeontologists such as Mary Anning Find out about how Charles Darwin and Alfred Wallace developed their ideas on evolution

		Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses		
How does exercise affect your heart rate?		Describe the importance for humans of exercise, eating the right amounts of different types of food (fruit and vegetables, starchy food, dairy, protein and fats), and hygiene	Confidently describe and explain the importance for humans of exercise, eating the right amounts of different types of food and hygiene Begin to describe the special functions that different parts of the body have (the circulatory system and the functions of the heart, blood vessel, blood)	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way bodies function
What are magnets and how do they work?		Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties Identify and compare the suitability of a variety of everyday materials, including wood, metal,	Compare how things move on different surfaces, e.g. toy vehicles. Notice that some forces need contact between 2 objects (friction, air resistance etc), but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday

		plastic, glass, brick, rock, paper and cardboard for particular uses Begin to be able to observe and describe a range of different forces and how things move on different surfaces Begin to observe how magnets attract of repel each other and attract some materials but not others	Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials (paperclip, paper, book, pencil etc) Describe magnets as having 2 poles Predict whether 2 magnets will attract or repel each other, depending on which poles are facing	materials, including metals, wood and plastic
How does light affect growing plants?		Observe changes across the 4 seasons, winter, spring, summer and autumn Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of plants Observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant	Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (consider exploring cactuses) Analyse the advantages and disadvantages of plants having specific adaptations e.g. bright coloured and scented flowers

How do shadow puppets work?		Describe the simple physical properties of a variety of everyday materials Observe and describe weather associated with the seasons and how day length varies Begin to recognise that shadows are formed when the light from a light source is blocked by an opaque object Observe the ways in which the size of shadows may change	Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change (the closer to the light source the bigger the shadow, the further away the smaller it will be, when a light source moves the shadow will change e.g. if the light source is directly above the object the shadow will be underneath. If the object is to the side the shadow will appear on the opposite side).	Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks
How can I use classification keys to explore and group the animals in our local area?			Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement recognise that living things can be grouped in a variety of ways	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals

			Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment e.g. birds of prey, rabbits, moles and fish from local rivers. Find out about, describe and compare the animals that are found in our local area	Give reasons for classifying plants and animals based on specific characteristics Find out about, describe and compare the animals that are found in our local area and compare them to animals in other areas e.g. fish by the coast, animals by the coast (seals) Present this information using charts and graphs e.g. scatter graph, bar and line graphs
Can I create my own food chain to represent the animals in our local area?			Construct and interpret a variety of food chains, identifying producers, predators and prey Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from. Compare and contrast the diets of different animals (including their pets) and explore different ways of grouping them according to what they eat. Explore and use classification keys to help group, identify and name a	Compare and contrast food chains in our local area to food chains in other areas.

			variety of living things in their local and wider environment	
How do switches work?			Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Know how to work with electricity safely. Know some common insulators and conductors. Identify some common appliances that run on electricity.	Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram Construct simple series circuits Know how to work with electricity safely. Know some common insulators and conductors. Identify some common appliances that run on electricity.
How do musical instruments make sound?			Identify how sounds are made, associating some of them with something vibrating (the slam of a door, ringing of a bell, buzz of a bee) Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it e.g. glockenspiels, bells Find patterns between the volume of a sound and the strength of the vibrations that produced it	

			Recognise that sounds get fainter as the distance from the sound source increase	
How does the water cycle work?			Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature Observe and record evaporation over time.	Observe and record evaporation over time and use charts and graphs to present their findings.
How does food travel through our body?			Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat (discuss fats, starchy foods, fruits and vegetables, protein and dairy) Identify the different types of teeth in humans and their simple functions (premolar, canine, incisor, molar) Name the main body parts associated with the digestive system mouth, tongue, teeth, oesophagus, stomach, and small and large intestine, and describe and	Describe the ways in which nutrients and water are transported within animals, including humans

			understand their special function.	
Does the Earth move?			Describe the movement of the Earth and other planets relative to the sun in the solar system Describe the movement of the moon relative to the Earth Describe the sun, Earth and moon as approximately spherical bodies Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky Know and describe why it is not safe to look directly at the sun Find out about the way that ideas about the solar system have developed Understand how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.	
Can I group and classify the animals that live in the Amazon? How are they different to the animals that live in the UK?			Find out about and compare the animals that live in the UK and the Amazon (Jaguar, poison dart frog, pink river dolphin, sloth, red howler monkey, compare to previously learnt animals in the local area). Use classification keys to compare and contrast the animals that live in the UK Recognise that living things can be grouped in a variety of ways e.g. mammal,	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals (vertebrates, non-

			amphibian, vertebrate, non-vertebrate, flowering plants, non-flowering plants) Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	vertebrates, herbivores, carnivores, omnivores) Give reasons for classifying plants and animals based on specific characteristics Find out about, describe and compare the animals that are found in our local area and compare them to animals the Amazon
How does our circulatory system work and how does it change/function when we exercise?			Confidently describe and explain the importance for humans of exercise, eating the right amounts of different types of food (dairy, fruit and vegetables, fats, protein and starchy food) and hygiene Describe some of the special functions that different parts of the body have (circulatory system, blood, blood vessels, heart)	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Explore and answer questions to understand how the circulatory system enables the body to function. Explore the work of scientists and scientific research to find out about relationship between diet, exercise, drugs, lifestyle and health.
How does the distance from the light source affect the size of the shadow?			Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in what happens to shadows when	Explore the way that light behaves, including light sources, reflection and shadows, making predictions using their prior learning

			the light source moves or the distance between the light source and the object changes.	Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
What can affect how things move?			Compare how things move on different surfaces, e.g. racing cars, normal cars, trucks, vans, planes. Notice that some forces need contact between 2 objects (air resistance, friction), but magnetic forces can act at a distance Compare how different things move and group them	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
How does voltage/number of cells affect the brightness of the bulb or loudness of the buzzer?			Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Note: pupils might use the terms current and voltage, but these should not be	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Construct simple series circuits Try different components, for example, switches, bulbs, buzzers and motors and explain what happens when they do so

			introduced or defined formally at this stage. Know how to work with electricity safely. Know some common appliances that run on electricity.	Represent a simple circuit in a diagram using recognised symbols Know how to work with electricity safely. Know some common appliances that run on electricity.
What are reversible and irreversible changes?			Know that some materials (soap, salt and sugar) will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (evaporation) Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning Explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.	
How do the life cycles of animals differ? What is the life process of reproduction and why is it important?			Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Begin to talk about the changes as humans develop to old age (stages of foetus, baby, child, adolescence, adult, old age)	Describe the changes experienced in puberty. Research the gestation periods of other animals and comparing them with humans (elephants, giraffes, gerbils) Recognise that living things produce offspring of the same kind, but normally offspring vary and are not

			Begin to find out about different types of reproduction and gestational periods of humans and other animals. Match a range of offspring to their parents and describe how they may be similar or different (humans, elephants, giraffes, butterflies, fish/tadpoles)	identical to their parents (humans, elephants, giraffes, butterflies, fish/tadpoles, whale, rabbit, dogs, specifically cross breed) Find out about and describe different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.
How can changes in animals affect their ability to survive? What happens to humans as they develop to old age?			Recognise that environments can change and that this can sometimes pose dangers to living things (deforestation, rising temperature, floods)	Describe the changes as humans develop to old age (stages of foetus, baby, child, adolescence, adult, old age) Draw a timeline to indicate stages in the growth and development of humans. Describe the changes experienced in puberty. Recognise that living things have changed over time and fossils provide information Identify how plants and animals are suited to their environment and that changes in environments may lead to evolution (giraffes longer necks,

				camouflaged animals in the rainforest)