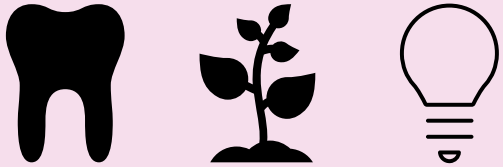
Meole Brace
C of E Primary School and Nursery

Science Subject Handbook



Our vision and rationale for Science

Science is the study of the world around us and we aim to deliver a high-quality curriculum that will develop a confidence within our pupils for them to explore the wider community and the environments in which they live.

Our science curriculum allows our pupils to develop our school's core values of perseverance, respect and community.

While working scientifically, pupils will persevere in a range of experiments, investigations and inquiries to broaden their understanding of the disciplines: Physics, Biology and Chemistry. We intend to satisfy their curiosity and equip them for our ever-changing world.

Science lends itself to excellent cross-curricular links and we will provide opportunities that ensure the children develop a deeper respect of the world in which they live.

In addition to all of the above, the children will develop an enjoyment of the subject, be able to explain processes and make informed predictions based on previous learning developing and consolidating their knowledge, skills and understanding year on year.

Curriculum Subject Leaders

Mr. Andrew Nodder

Mrs Ella Turner

National Curriculum Progression for Science

Biology	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them. Talk about ourselves and identify similarities and differences. Talk about members of their immediate family and community. Name and describe people who are familiar to them. Know and talk about different factors that support their overall health and wellbeing	Identify and name a range of common wild and garden plants including deciduous and evergreen trees Name the petals, stem, leaf and root of a plant Point out some differences between different animals Classify common animals (birds, fish, amphibians, reptiles, mammals) Describe how an animal is suited to its environment Identify parts of the human body and say which part of the body is associated with each sense Name, draw and label the basic parts of the human body	Explore and compare the differences between things that are living, dead and things that have never been alive Identify that most living things live in habitats to which they are suited Describe how different habitats provide for the basic needs of different kinds of animals and plant, and how they depend on each other Identify and name a variety of plants and animals in their habitats, including micro-habitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain	Identify and describe the functions of different parts of flowering plants, for example, roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering Plants, including pollination, seed formation and seed dispersal Identify that animals, including humans, need the	Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things Identify and describe the simple functions of the basic parts of the human digestive system Describe the simple functions of the organs of the human digestive system Identify the different types of teeth in humans and their simple functions	Describe the differences in life cycles of a mammal, an amphibian, as insect and a bird Describe the life process of reproduction in some plants and animals Describe the changes as humans develop to old age	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans

	including; regular physical activity, tooth brushing, healthy, healthy sleep routines and personal hygiene. Begin to understand the need to respect and care for the natural environment and all living things. Begin to understand the key features of the life cycle of plants and animals. Observe growth in ourselves, others, animals and plants over time.	Classify animals by what they eat (carnivore, herbivore, omnivore) Sort some animals by body covering, for example, scales, fur and skin	Identify and name different sources of food 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 Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene Find out about and describe the basic needs of animals, including humans for survival (water, food and air) Notice that animals, including humans, have offspring which grow into adults	right types and amount of nutrition Understand 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	Construct and interpret a variety of food chains, identifying producers, predators and prey		Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Chemistry	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Explore the natural world around them. Describe what they see, hear, smell and feel whilst outside. Explore the sense of taste through food and cooking. Explore a range of materials, thinking about their properties, what they're used for and why. Sorting materials based on their basic properties, e.g. soft, hard, smooth, rough. Observe changes in properties of materials when they are mixed, heated or cooled.	Explain what material objects are made from Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock Explain why a material might be useful for a specific job Describe the simple physical properties of a variety of everyday materials e.g. hard/soft; stretchy/stiff; shiny/dull; rough smooth; waterproof/ not waterproof; bendy/ not bendy; absorbent/ not absorbent; opaque/ transparent Sort materials into groups 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 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	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials chance state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets Know that some materials will dissolve in liquid to form a solution Describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	

						Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	

Physics	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Explore the natural world around them. Describe what they see, hear, smell and feel whilst outside. Explore and use vocabulary linked common types of weather, climate and seasons. Explore movement of sand and water. Explore how sound changes in different	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies	Recognise that they need light in order to see things that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when the	Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sound travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it	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	Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the

	contexts and environments. Explore the earth, sun and moon. Observe changes in a range of contexts including; weather, seasons, light and dark and sound. Explore forces they can feel.			light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials Describe magnets as having two poles	Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a	explain day and night and the apparent movement of the sun across the sky 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	same shape as the objects that cast them Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram

				Predict whether two magnets will attract or repel each other, depending on which poles are facing	lamp lights in a simple series circuit Recognise some common conductors and insulators and associate metals with being good conductors		

Working Scientifically	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Explorers **Investigators** **Creators** Repeat actions that have an effect and explore how things work. Hands on exploration of materials (including natural materials indoors and outside) with different properties, sort and make collections. Explore and respond to different natural phenomena.	Talk about what they see, touch, smell hear or taste Ask simple questions and recognise that they can be answered differently Use simple equipment to help make observations Perform a simple test Tell other people about what they have done Identify and classify things they observe Explain what has been found out	Use scientific vocabulary to describe what they have seen and measured Ask people questions and use secondary sources to find answers Observe closely, using simple equipment Say whether things happened as they expected Organise things in to groups Find simple patterns (or associations)	Ask relevant questions and use different scientific enquires to answer them Plan a fair test and explain why it is fair Explain why they need to collect information to answer a question Make systematic and careful observations and where appropriate, take accurate measurements using standard units Record their observations in different ways, for	Ask relevant questions and use different types of scientific enquires to answer them Set up simple practical enquires, comparative and fair tests Decide which information needs to be collected and decide which is the best way for collecting it Take measurements using different equipment and units of measure and record what they have found in a range of ways	Plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

	Make connections between the features of their family and other's families, notice differences between people and develop an awareness of their own life stories and family history. Describe what they see, hear, smell and feel whilst outside using a wide vocabulary. Observe growth in ourselves, others, animals and plants over time, including life cycles. Recognise similarities and differences between life in this country and life in other countries including some environments that are different to the one in which they live. Observe changes in properties of materials when	Show they work using pictures, labels and captions Record findings using standard units Put some information in a chart or table	Use text, diagrams, pictures, charts, tables to record their observations Perform simple tests Suggest how, and use prompts, to find things out	example, labelled diagrams, charts etc. Explain what they have found out and use their measurements to say whether it helps to answer their question Use a range of equipment including a thermometer and data logger	Make accurate measurements using standard units Explain their findings in different ways, for example, display, presentation, writing Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Make predictions based on something they have found out Record and present what they have found using scientific language, drawings, labelled diagrams, keys, bar charts and tables	Use test results to make predictions to set up further comparative and fair tests Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identify scientific evidence that has been used to support or refute ideas or arguments	Use test results to make predictions to set up further comparative and fair tests Report and present findings from enquires, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

	they are mixed, heated or cooled. Observe cause and effect in a range of contexts including: weather, seasons, light and dark and sound.						
Progression in Vocabulary	Look closely, observe, watch, touch, feel, smell, listen, same, different, compare, ask questions, record, sort, group.	Observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn Diagram, ask questions, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, answer questions, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources.		Practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve.		Variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter.	

Science Progression of Knowledge

		Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Concepts and Themes	Biology – Living things.							

Animals including humans	**Core Knowledge**	-Know the names of the facial features and basic body parts -Know that we are all different, but we have features that are the same. For example, eye, hair and skin colour -Know some members of their immediate family and community -Know some healthy and unhealthy foods -Know how to look after living things -Know the key stages of the life cycle for chicks and frogs	-Know the names of a wider range of body parts -Know that we are all different but that all humans share common features. For example, height, likes and dislikes, skills and interests -Know and talk about member of their immediate family and community -Know and talk about how to keep ourselves healthy through food we choose, brushing teeth, exercising, and getting enough sleep -Know how to respect and look after living things -Know the key stages of the life cycle for humans	-Know how to classify a range of animals by amphibian, reptile, mammal, fish, and birds -know and classify animals by what they eat (carnivore, herbivore and omnivore) -know how to sort by living and non-living things. -Know the name of parts of the human body that can be seen.	-know the basic stages in a life cycle for animals (including humans) -Know why exercise, a balanced diet and good hygiene are important for humans	- know about the importance of nutritious, balanced diet -Know how nutrients, water and oxygen are transported within animals and humans -know about skeletal and muscular system of a human	-Identify and name the parts of the human digestive system -Know the functions of the organs in the human digestive system -Identify and know the different types of human teeth -Know the functions of different human teeth. -use and construct food chains to identify producers, predators and prey	Create a timeline to indicate stages of growth in humans.	-Identify and name the main parts of the human circulatory system -know the function of the heart, blood vessels and blood -know the impact of diet, exercise, drugs and lifestyle on health -know the ways in which nutrients and water are transported in animals, including humans

	Scientific Enquiry	*What do we look like?* *Who is in my family?* *What should I eat and drink?* *What does a chick need to grow?*	*How am I different/the same as my friend?* *Who helps me?* *How can I keep myself healthy and safe?* *How can we look after animals?*	*Are we all the same or are we all different?* Chn discover what is the same and what is different about their bodies.	*Is all food good for us?* Chn look at a variety of food labels (looking at the traffic light nutrition), comparing which are healthy and why.	*How does our body move and stand up?* Chn use information from science encyclopaedias / textbooks to label a human skeleton and answer simple questions about it.	*Are some animals more alike than others?* Children to use pictures to put animals into groups in different ways (e.g. where they live, what they eat, how they move, how many legs, etc) moving on to using keys to differentiate between closely related animals.	*Is our heart rate always the same?* Chn to investigate the effect of exercise on heart rate and how long it takes for their pulse to return to the resting rate after exercising for a minute.	*Is our heart rate always the same?* Investigate the effect of exercise on heart rate and how long it takes for their pulse to return to the resting rate after exercising for a minute. *How long does it take to get fitter?* Over the course of a month, chn investigate whether some volunteers (who do consistent exercise at break time) can lower their resting heart rate.
	Vocabulary	Face, eyes, nose, mouth, ears, hair, head, arm, leg, toes, fingers, tummy, back, brown, blue, green, yellow, orange, white, pink, peach, mum, dad, brother, sister, grandma, grandad, baby, grownup, head teacher, teacher, egg, chick, bird, caterpillar, cocoon, butterfly, frog	Retrieval vocab: (see nursery) New vocab: bones, skin, eyebrows, nostrils, cheek, chin, stomach, ankle, knees, elbows, wrists, shoulders, blonde, ginger, curly, straight, long, short, tall, tallest, medium, shortest, bigger, smaller, younger brother/sister, older brother/sister, auntie, uncle, school	energy, growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, organ	Retrieval vocab: growth, habitat, reproduction, nutrients, consumption New vocab: offspring, adult, bulb, seed, survival, temperature, hygiene, exercise	Retrieval vocab: component, energy, growth, reproduction, offspring, adult, nutrients, consumption, vertebrate, skeleton New vocab: extinction, vitamin, balanced diet, cartilage, invertebrate, contract, loosen, ribcage,	Retrieval vocab: absorption, component, dissolving, energy, nutrients, consumption, hygiene, herbivore, carnivore, organ New vocab: digestion, excretion, peristalsis, anus, duodenum, small intestine, large intestine, stomach, rectum, oesphagus, tongue, saliva, acid, bile, enzymes, incisors, canines, molars, predator, prey, producer,	life cycle, life span, embryo, womb, weaned, adolescence,	Retrieval vocab: component, energy, growth, survival, nutrients, consumption, skeleton, ribcage, protein, carbohydrate, fat, digestion, skeleton, organ,digestion, excretion, peristalsis, anus, duodenum, small intestine, large intestine, stomach, rectum, oesphagus, tongue, saliva, acid, bile, enzymes,

		spawn, tadpole, froglet, frog, grow, change, die, fur, feathers, scales, tail, wings, beak, claws, grow, change, smell, taste, hear, see, deaf	community, church community, adults, children, people who help us, animal names, land, water, jungle, desert, sea, hot, cold, wet, dry, snow, ice,				consumer, primary, secondary, tertiary		incisors, canines, molars New vocab: artery, aorta, atrium, blood vessels capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate, body, cranium, mandible, sternum, vertebrae, femur, tibia, fibula, patella, humerus, radius, ulna
Plants	**Core Knowledge**	-Know the basic parts of a plant – stem, leaf, flower -Know the basic parts of a tree – trunk, branch, leaf -Know how to look after plants -Know the key stages of the life cycle for beans	-Know the parts of a plant/tree – roots, stem/trunk, branch, leaf, flower, blossom, fruit -Know some of the key fruits and vegetables ready at harvest time -Know how to respect and look after plants -Know the key stages of the life cycle for sunflowers	-Know and name a variety of common wild, and garden plants -Know and name the petals, stem, leaves and root of a plant -Know and name the roots, trunk, branches and leaves of a tree	-know and explain how seeds and bulbs grow into plants -know what plants need in order to grow and stay healthy (water, light and suitable temperature)	-Know the function of different parts of flowering plants and trees -Know how water is transported within plants -Know the plant life cycle, especially the importance of flowers			
	Scientific Enquiry	*What happens to trees in autumn?* *What does a bean need to grow?*	*What happens to trees/plants/crops in autumn?* *How can we look after plants?*	*What parts is a plant made of?* Chn use pages from a science encyclopaedia to draw and label	*Do plants grow the same amount every day?* Chn measure the height of a growing plant	*Do all plants need exactly the same things?* Chn give both a parsley plant and a small cactus			

			What does a sunflower need to grow?	different plants, spotting similarities and differences.	over a period of days and weeks	minimal water over a two week period and observe the changes (perhaps drawing the result)			
	Vocabulary	Plant, leaf, stem, branch, seed, berry, fruit, vegetable, plant, hole, dig, water, grow, shoot, die, dead, soil, names of plants.	Retrieval vocab: (see nursery) New vocab: tree, bush, herb, names of plants they see, petal, blossom, flower, bark, crop, bulb, seed, nut, acorn, pine cone,	energy, habitat component, energy, growth, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower	Retrieval vocab: growth, habitat, reproduction, nutrients, consumption New vocab: offspring, adult, bulb, seed, survival, temperature, hygiene, exercise	Retrieval vocab: component, energy, growth, habitat, decay, , bulb, seed, survival, temperature nutrients, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, New vocab: extinction, fruit, nectar, anther, ovary, ovule, petal, pollen, stigma, style, stamen, function, exchange, dispersal, fertilization, insect			
Living things and their life cycle	**Core Knowledge**	-Know how to look after living things -Know the key stages of the life cycle for chicks and frogs	-Know how to respect and look after living things -Know the key stages of the life cycle for humans		-Know the basic stages in a life cycle for animals (including humans)			-know the life cycle of different living things e.g. mammal, amphibian, insect and bird -know the differences between different life cycles -know the process of reproduction in animals	

								-create a timeline to indicate stages of growth in humans	
	Scientific Enquiry	*What does a chick need to grow?*	*What does a human need to grow?* *How does a human change as they grow?* *How can we look after animals?*		Is everything on Earth alive?			If life has existed for billions of years, why are there still people alive today?	
	Vocabulary	baby, grownup, egg, chick, bird, caterpillar, cocoon, butterfly, frog spawn, tadpole, froglet, frog, grow, change, feathers, die	Retrieval vocab: (see nursery) New vocab: adults, children, baby, toddler, respect,		Retrieval vocab: habitat, growth, absorption, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, herbivore, carnivore, omnivore New vocab: birth, decay, energy, reproduction, microhabitat, dead, life cycle, food chain, source, nutrients, consumption, environment			New vocab: life cycle, life span, embryo, womb, weaned, adolescence, metamorphosis, pupa, larva, chrysalis, caterpillar, tadpole, hatchling, fledgling, insect	
Living things and their habitats	**Core Knowledge**	-Know what I see, hear, smell and feel when I am outside -Know about my local environment	-Know and describe what I see, hear, smell and feel when I am outside -Know some environments that are different		- Classify things by living, dead or never lived -know how a specific habitat provides for the basic needs of things living there (plants and animals)		-Use classification keys to group, identify and name living things -Know how changes to an environment could endanger living things -Group materials based on their state	-know the life cycle of different living things e.g. mammal, amphibian, insect and bird. -know the differences between	-Classify living things into broad groups according to observable characteristics and based on similarities and differences

		-Know that animals live in different places around the world	to the one in which they live -Know and describe some of the ways animals are suited to their environment		-match living things to their habitat -Name some different sources of food for animals -Know about and explain a simple food chain		of matter (solid, liquid, gas)	different lifecycles. -know the process of reproduction in plants. Know the process of reproduction in animals.	-Know how living things have been classified -Give reasons for classifying plants and animals in a specific way
	Scientific Enquiry	*What can you see, hear, smell and feel whilst you are outside?* *What is it like in and around my school?* *Where do different animals live?*	*What can you see, hear, smell and feel whilst you are outside?* *What is it like in the Savannah?* *How do the animals that live there survive?*		Do all animals start off small? Chn pair up pictures of a variety of animals with their very young and juvenile forms.		Are some animals more alike than others? Children to use pictures/descriptions to put animals into groups in different ways (e.g. where they live, what they eat, how they move, how many legs, etc) moving on to using keys to differentiate between closely related animals.		What make bread rise? Chn are shown how yeast, sugar and warm water causes a reaction; they then investigate what happens to this reaction when they change particular variables of their choice (sugar/no sugar, water temperature, adding chemicals, etc)
	Vocabulary	Home, nest, pond, farm, incubator, brooder box, heat lamp, sawdust, water, grain, food, drink, see, hear, smell, feel, classroom, playground, forest school, field, reflection garden,	Retrieval vocab: (see nursery) New vocab: Habitat, place, live, survive, Savannah, Africa, desert, grasslands, waterhole,		Retrieval vocab: habitat, growth, absorption, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, herbivore, carnivore, omnivore New vocab: birth, decay, energy, reproduction, microhabitat, dead, life cycle, food chain, source, nutrients,		Retrieval vocab: decay, energy, habitat, freezing plant, structure, herbivore, carnivore, omnivore, microhabitat, environment, reproduction, vertebrate New vocab: kingdom, classification key, species, fungi, bacteria, climate change, characteristics,	Retrieval vocab: decay, plant, structure, reproduction, nutrients, reproduction, fish, bird, amphibian, reptile, mammal, fruit, nectar, anther, ovary, ovule, petal, pollen, stigma, style, stamen, function, exchange, dispersal, fertilization, insect, vertebrates	Retrieval vocab: component, habitat, plant, structure, fish, bird, amphibian, reptile, mammal, kingdom, classification key, species, fungi, bacteria, characteristics, offspring, vertebrate, invertebrate, insect New vocab: micro-organism, virus, thorax, arthropod,

					consumption, environment		offspring, extinction, pollution	New vocab: life cycle, life span, embryo, womb, weaned, adolescence, metamorphosis, pupa, larva, chrysalis, caterpillar, tadpole, hatchling, fledgling, insect	abdomen, arachnid, antenna, jointed limbs
Evolution and Inheritance	**Core Knowledge**								-Know how the earth and living things have changed over time -Know how fossils can be used to find out about the past -Know about reproduction and offspring (recognising that offspring normally vary and are non-identical to their parents) -Know how animals and plants are adapted to suit their environment -Link adaptation over time to evolution -Know about evolution and can explain what it is
	Scientific Enquiry								Why do different species of animals look different? Chn sort various species of animals

									into the environments in which they are adapted based on their physical attributes and listed behaviours
	Vocabulary								Retrieval vocab: birth, decay, energy, habitat, irreversible, extinction, microhabitat, dead, life cycle, food chain, source, nutrients, reproduction, consumption, environment, extinction, species, characteristic, adaptation New vocab: evolution, natural selection, variation, advantageous
		Nursery	**Reception**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	Concepts and Themes	Chemistry							
Solids, Liquids and gases. **(States of Matter)**	**Core Knowledge**						-Know the temperature at which materials change state -Know about and explore how some materials can change state -Know the part played by evaporation and		

							condensation in the water cycle		
	Scientific Enquiry						Does water always melt at the same speed? Chn to observe and record as ice melts in different conditions (e.g. outside vs radiator, wrapped in insulation vs not)		
	Vocabulary						Retrieval vocab: absorption, dissolving, energy, evaporation, freezing, matter, melting, particle, temperature, ice, water, solid New vocab: bond, condensation, evaporation, reversible, boiling point, melting point, liquid, gas, thermometer, water cycle, continuous precipitation, transpiration, surface runoff process, sublimation		
Rocks and fossils	**Core Knowledge**					-Compare and group rocks based on their appearance and physical properties, giving reasons -Know how soil is made and how fossils are formed -Know about and explain the difference			

						between sedimentary, metamorphic and igneous rock			
	Scientific Enquiry					Are all rocks made in the same way? Using criteria, chn sort rock samples (and pictures) into the three types.			
	Vocabulary					Retrieval vocab: decay, matter, melting, material, New vocab: extinction, particle, igneous, metamorphic, sedimentary, paleontologist, weathering, molten rock, crust, tectonic plates, scavengers, fossil			
Materials	**Core Knowledge**	Know and sort materials by exploring the feel of them. Know how materials change when making salt dough, observing ice and snow and making gloop. Know the best materials to make a house (Three Little Pigs)	Know why different materials are used for clothes (e.g. firefighter clothes). Know how to sort materials by their feel and texture. dough). Know that materials change when they are mixed, heated or cooled (e.g snow, frost, ice, baking bread, making salt	-Know the name of the materials an object is made from -Know about the properties of everyday materials	-Know how materials can be changed by squashing, bending, twisting and stretching -Know why a material might or might not be used for a specific job			-Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity [thermal and electrical]. And response to magnets -know and explain how a material dissolves to form a solution -Know and show how to recover a substance from a solution	

			Know the different materials used to make different types of homes.					-Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) -Know and demonstrate that some changes are reversible and some are not -Know how some changes result in the formation of a new material and that this is usually irreversible	
	Scientific Enquiry	What does it feel like? What has happened? How did it change? Why? What will you build your house with?	What does a firefighter need? How are the materials the same/different? How do the ingredients change when we make bread? Why did they change? What is Handa's house made from? What is your home made from?	*Are all materials the same?* -Chn compare a variety of materials, deciding which are hard, soft, strong, weak, smooth, rough, etc. -Chn undertake actions to test whether each material has the property (e.g. touching, weighing, etc)	*What materials could be used to make a good raincoat?* Chn test whether different materials are waterproof, flexible and light. *What materials could be used to make a good bike shed* Chn test whether different materials are strong, hard and waterproof			What happens to salt in water? Chn to stir a small amount of salt, sugar, small stones and sand into water and to observe what happens with each and to determine which is soluble in water and which is insoluble in water Can I make a gas using a solid and a liquid? Chn add vinegar (ethanoic acid) to bicarbonate of soda and observe the reaction, specifically the	

								bubbles of carbon dioxide given off Is it possible to separate even very small things like sand, salt and stones? Chn use filtering and evaporation to separate a mixture of sand, salt and stones.	
	Vocabulary	Hard, soft, rough, smooth, bumpy, wet, dry, stick, sticks, bricks, straw, water, snow, ice, hot, cold, runny, powder, melt, house	Retrieval vocab from Nursery plus: Fireproof, protect, safe, waterproof, home, mud, straw, mix together, change, cook/bake, heat, cool	absorption, matter, property, wood, plastic, glass, metal, water, rock	Retrieval vocab: absorption, matter, property New vocab: conductor, brick, paper, cardboard, friction, movement, suitability, surface, stretch, twist, waterproof, deformation, flexible, rigid			Retrieval vocab: absorption, bond, condensation, conductor, evaporation, matter, melting, particle, property, reversible, freezing, wood, plastic, glass, metal, water, rock, suitability, surface, waterproof, flexible, rigid, boiling point, melting point, solid, liquid, gas, sublimation, magnetic New vocab: irreversible, dissolve, soluble, insoluble, solvent, solute, solution, filter, sieve, saturation, crystallization, thermal, chemistry	

		Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Concepts and Themes	Physics.							
Forces and Magnets	**Core Knowledge**	Know and explore how toys can be moved.	Know and explore how to make different equipment work and move by pushing and pulling (e.g. magnetic toys, cogs, cars down ramps, water and sand in tubes, etc)			-Know about and describe how objects move on different surfaces -Know how a simple pulley works and use one to lift an object -Know that some forces require contact and some do not, giving examples -Know about and explain how magnets attract and repel. Predict whether magnets will attract or repel and give a reason		-Know what gravity is and its impact on our lives -Identify and know the effect of air and water resistance -Identify and know the effect of friction -Explain how levers, pulleys and gears allow a smaller force to have a greater effect	
	Scientific Enquiry	*How can we make the car move?* *How do you thread the beads onto the string?*	*How can you make the car travel further?* *What can you feel when you hold the magnet? (against different materials/objects)*			Are all metals attracted to magnets? Chn sort materials into magnetic and non-magnetic materials using a magnet and find other materials around the room that		How do parachutes work? Chn to create parachutes, changing a variable to try to isolate what is needed for an effective parachute (e.g. changing parachute material, size, shape, etc)	
	Vocabulary	Hold, move	Retrieval vocab from Nursery plus: Press, push, pull			Retrieval vocab: energy, matter, property, wave, metal, material,		Retrieval vocab: energy, matter, particle, surface, friction, force,	

						surface, friction, force, stretch, squash, rough, smooth New vocab: magnetic, non-magnetic, pole, north, south, sliding friction, static friction, elastic, resist, attraction, repulsion		stretch, squash, rotation, rough, smooth, sliding friction, static friction New vocab: acceleration, air resistance, buoyancy, effort, force meter, fulcrum, gravity, load, mass, mesh, Newton, pivot, rigid, streamlined, terminal velocity, unsupported, water resistance, weight	
Light	**Core Knowledge**	Know the differences between day and night.	Know we need light to see well. Know it is difficult to see in the dark. Know that shadows can be made on a sunny day.			-Know that dark is the absence of light -Know that light is needed in order to see and is reflected from a surface -Know and demonstrate how a shadow is formed and explain how a shadow changes shape -Know about the danger of direct sunlight and describe how to keep protected			-Know how light travels -Know and demonstrate how we see objects -Know why shadows have the same shape as the object that casts them -Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.
	Scientific Enquiry	*What is day?* *What is night?*	*Why can we see well in the daytime?* *Why can't we see well at night?*			Does the amount of light we experience only change a lot at night? Using 'Lux' ipad app, chn gather data on light			Why can I hear round corners but not see round corners? Chn to use mirrors and torches to investigate how

			How can we make a shadow?			levels over the period of an hour and over the period of 24 hours. Chn interpret the gathered data. Why do shadows change during the day? On a sunny day, using a metre stick, chn note the changing length of a shadow thrown by a metre stick or other object.			light travels in straight lines and reflects off mirrors.
	Vocabulary					Retrieval vocab: absorption, energy, property, reflection New vocab: wave, mirror, incident ray, image, beam, photons, solid, opaque, transparent, object, source, data logger (NB: the Sun and the Moon are capitalized when being discussed in an astronomical context.)			Retrieval vocab: absorption, energy, particle, property, reflection, wave, mirror, incident ray, image, beam, photons, solid, opaque, transparent, object, source, vibration, percussion instrument, wind instrument, string instrument, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum New vocab: angle of incidence, angle of reflection, refraction, spectrum, translucent,

									medium, periscope
Electricity	**Core Knowledge**						-Identify and name appliances that require electricity to function -Construct a series circuit -Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) - Predict and test whether a lamp will light within a circuit -Know the function of a switch Know the difference between a conductor and an insulator; giving examples of each		-Compare and give reasons for why components work and do not work in a circuit -Draw circuit diagrams using correct symbols -Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer
	Scientific Enquiry						Does electricity flow easily through all objects? Chn to create a small circuit to test whether objects are conductors or insulators (e.g. circuit with bulb which lights when a gap in the circuit is bridged.)		Is it possible to change how bright a bulb is or how loud a buzzer is? Chn create circuits to investigate the effect of different voltages on different components.
	Vocabulary						Retrieval vocab: absorption, conductor, energy, insulator, wave New vocab: particle, vibration, percussion instrument, wind instrument, string instrument,		Retrieval vocab: circuit, component, conductor, energy, insulator, particle, property, material, appliance, charge, electron, battery,

							frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum		cell, bulb, buzzer, switch, wire, current electricity, static electricity, negative terminal, positive terminal, voltage, chemical reaction, emit New vocab: series circuit, parallel circuit, resistance, voltage
Sound	**Core Knowledge**	Know that we use our ears to hear sound. Know that sounds can be quiet or loud.	Know and explore how to change voice and instrumental sounds from loud to quiet, fast to slow.				-Know how sound is made, associating some of them with vibrating -know how sound travels from a source to our ears Know the correlation between pitch and the object producing the sound -Know the correlation between the volume of the sound and the strength of the vibrations that produced it -Know what happens to a sound as it travels away from its source		
	Scientific Enquiry	What do we use to hear? Is it loud? Is it quiet?	*Can you make the sound loud?* *Can you make the sound quiet?* *Can you make the sound fast?* *Can you make the sound slow?*				How do instruments make different sounds? Chn to make a basic guitar or flute with different notes possible to show how different vibrations make notes of different pitch.		

			How did the sound change?						
	Vocabulary						Retrieval vocab: absorption, conductor, energy, insulator, particle, wave New vocab: vibration, percussion instrument, wind instrument, string instrument, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum		
		Nursery	**Reception**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	Concepts and Themes	Earth Science.							
Earth and Space	**Core Knowledge**	Know and use the names of the earth/world, sun and moon in songs and rhymes.	Know we live on planet earth. Know that the sun can usually be seen in daylight. Know not to look directly at the sun. Know that too much sun can burn our skin. Know that the moon can usually be seen at night.					-Know about and explain the movement of the Earth and other planets relative to the sun -Know about and explain the movement of the Moon relative to the Earth -Know and demonstrate how night and day are created -Describe the Sun, Earth and Moon (using the term spherical)	

	Scientific Enquiry		*What is earth?* *Why can't we look straight at the sun?* *How can we keep safe in sunny weather?* *When do we usually see the sun/moon?*					What shape is the moon and does it change? Chn keep a moon diary over the period of a month (focusing on moon shape) and a moon diary for one clear evening (focusing on position in the sky) and analyse their results.	
	Vocabulary	Sun, moon, earth, world	Retrieval vocab from nursery plus: Day, night, planet, damage eyes, safe, sun lotion, protect skin, burn, drink, hydrate, sunhat					Retrieval vocab: absorption, energy, freezing, melting, orbit, reflection, wave, Sun, spring, summer, autumn, winter New vocab: planet, satellite, sphere, solar system, eclipse, star, universe, constellation, axis, celestial body, Moon, rotating, lunar, solar, telescope, rotation	
Seasonal Changes	**Core Knowledge**	Know what the weather is like today. Know what they can see, hear, smell and feel whilst outside. Know some clothes to wear in hot weather.	Know and describe what they can see, hear, smell and feel whilst outside. Know and name different types of weather. Know and use some vocabulary to talk about the	To know the names of the four seasons and observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.		To know that light from the sun can be dangerous and that there are ways to protect their eyes.		Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	

		Know some clothes to wear in cold weather.	four seasons Spring, Summer, Autumn, Winter. Know how a tree changes in the four different seasons. Know how some animals prepare in winter.						
	Scientific Enquiry	*What is the weather like today?* *What can we wear to keep warm?* *What can we wear to keep cool?*	*What words can you use to describe the weather today?* *What happens to a tree in spring/ summer/ autumn/ winter?* *How do hedgehogs and squirrels get ready for winter?*	Is the weather the same every day? Chn keep a weather diary.					
	Vocabulary	Cold, hot, clothes, wear, warm, cool, sunny, windy, rainy, hot, cold, icy, snowy	Retrieval vocab from nursery plus: Spring, Summer, Autumn, Winter, seasons, stormy, lightning, thunder cloudy, frosty, flood, rainbow, puddles, tree, change	energy, freezing, melting, orbit, reflection, Sun, clouds, wind, snow, ice, spring, summer, autumn, winter				New vocab: planet, satellite, sphere, solar system, eclipse, star, axis, Moon, rotating, lunar, solar, telescope, rotation	

Science Unit Coverage

	Autumn Term	Spring Term	Summer Term
Rec			
1	Seasonal Changes **Biology: Animals including Humans** Types of animals (c, o , h)	Seasonal Changes **Chemistry: Everyday Materials** (naming)	Seasonal Changes **Biology: Plants** (garden, wild, deciduous, evergreen & basic structure of flowering plants & trees) **Secret Hills**
2	**Biology: Living things and their habitats**	**Biology: Animals including humans** Offspring, survival, exercise	**Biology: Plants** Seeds into plants and plants' needs (water/light/temperature). **Chemistry: Use of Everyday materials** Suitability – wider variety of materials Shapes of objects can be changed
3	**Chemistry: Rocks and Fossils** **Secret Hills** **Physics: Light** sun, reflects, shadows	**Biology: Animals including humans** Skeletons, movement, nutrition	**Biology: Plants** (functions of different parts) requirements as above + nutrients **Physics: Forces (friction) and magnets**
4	**Physics: Sound** **Physics: Electricity**	**Biology: Animals including humans** Digestion Teeth – **Dentist visit** Food chains	**Biology: Living things and their habitats** (related to animals) Classification keys Environmental changes **Chester Zoo** **Chemistry: Materials** States of Matter
5	**Physics: Forces**	**Chemistry: Properties and changes of materials.**	**Earth science: Earth and Space.** **Jodrell Bank** **Biology: Living things and their habitats** Life Cycles **Humans as Animals** RSE
6	**Biology: Animals including humans** Circulatory system Diet, exercise & drugs Nutrients and water (diffusion)	**Biology: Living things and their habitats** Classification **Biology: Evolution and Inheritance** Darwin Tour	**Physics: Light** straight lines, how we see light **Physics: Electricity** Voltage and changes on circuits Symbols on circuit drawings