Progression in Science – The Mill Academy

Scientists across the Curriculum - Includes: Women, Men, British, European, American, Asian

	Nursery	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn Scientists		Lewis Latimer 1848-1928 Massachusetts, USA	Dr Marshall Shepherd Born 1970s Georgia, USA	Louie Pasteur 1822 – 1895 France	Charlotte Armah Born 1970 London, UK	Percy Lavon Julian 1899 – 1975 Alabama, USA	Mae C. Jemison Born 1956 Alabama, USA	Rosalind Franklin 1920 – 1953 London, England
Spring Scientists		Roy Chapman Andrews 1884-1960 Wisconsin, USA	David Attenborough Born 1926 British	Mary Anning 1799 – 1847 Lyme Regis, UK	Hayleigh Perks Born 1994 Birmingham, UK	Rachel Carson 1907 – 1964 Pennsylvania, USA	Dorothy Hodgkin 1910 – 1994 Born Egypt, British	Gladys West Born 1930 Virginia, USA
Summer Scientists		Dian Fossey 1932-1985 California, USA	Zhenan Bao Born 1970 From China Lives Chicago	C. V. Raman 1888 – 1970 India	Alice Ball 1892 – 1916 Seattle, Washington	J. J. Thompson 1856 – 1940 Manchester, UK	Dr Mark Richards Born 1970 Nottingham, UK	Carl Linnaeus 1707 – 1778 Sweden

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically- Skills	Use all their senses in hands- on exploration of natural materials Explore collections of materials with similar and/different properties Explore how things work.	**Self regulation:** Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate; - Give focused attention to what the teacher says, responding appropriately even when engaged in activity, and show an ability to follow instructions involving several ideas or actions. **Listening, attention and understanding:** - Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions; - Make comments about what they have heard and ask questions to clarify their understanding;	Ask simple questions. Observe closely. Perform simple tests to explore a question or idea suggested to them, with support. Gather and record data using a given table.	Ask simple questions and recognises that simple questions can be answered in different ways. Observe closely using simple equipment. Identify things to measure or observe that are relevant to the question or idea they are investigating using a simple test (in a group or independently) Record data in a wider range of given ways Use their data and results to answer questions Use observations and ideas to suggest answers to questions.	Ask relevant questions and use different types of scientific enquiries to answer them Make systematic and careful observations during a fair test Plan and carry out a simple fair test relevant to the question or ideas they are investigating Take and record accurate measurements using standard units (e.g. to a whole cm) Gather and record data in to simple formats e.g. tables, bar charts and pictograms Use simple scientific language to present findings Record and report findings from enquiries in labelled drawings and diagrams Draw simple conclusions using my own results Begin to recognise when a test is not fair and suggest improvements Identify differences and similarities	Ask relevant questions and use different types of scientific enquiries to answer them Set up simple practical enquiries, comparative and fair tests Know which are control, dependent and independent variables in a fair test Identify one or more control variables from those provided when conducting a fair test Make observations and take increasingly accurate measurements using standard units (e.g. to a decimal point) Use a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support their findings	Ask relevant questions and use different types of scientific enquiries to answer them Identify one or more control variables in investigations when conducting a fair test Identify which type of measurements should be taken Take accurate and appropriate measurements using specific, provided equipment Record data and results (e.g. using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs) Use test results to make predictions Report and present findings from enquiries with a given format	Ask relevant questions and use different types of scientific enquiries to answer them Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Recognise which type of practical enquiry is most appropriate to the question or idea being investigated, before planning and carrying out the enquiry Take measurements, using a range of scientific equipment, with increasing accuracy and precision Identify when to take 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 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 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
Vocabulary	Why, what, touch, feel, see	Question, answer, ask, notice, spook, look, listen, smell, touch/feel, taste, investigate, test, try it out	properties, magnifying glass, question, answer, observe, test, explore, gather, record, data, identify, classify, equipment, measure, table, diagram		fair test, comparative, observation, accurate, standard units, equipment, thermometer, data logger, gather, record, classify, present, data, tables, bar graph, presentation, conclusion, prediction, differences, similarities, theory, hypothesis, dependent variable, independent variable, results		controlled variables, classify, comparative, enquiry, predict, present, explain, conclusion, causal relationship, fair test, patterns, observations, accurate, precise, measurements, data, opinion, fact, communicate, diagram, labels, classification keys, line graph, scatter graph, repeat readings, secondary information, justify, outlier	

Topics	**Cycle 1:** -Float a boat -Fly a kite -Make blackberry crumble **Cycle 2:** -Blow bubbles -Perform a science experiment -Bake bread	**Cycle 1:** -Float a boat -Fly a kite -Make blackberry crumble **Cycle 2:** -Blow bubbles -Perform a science experiment -Bake bread		The Land Before Time Protecting the Polar Regions The Secret Garden		Save our Planet	Astrologists and Biologists Unite	Wolf Wilder
Living things and their Habitats- Knowledge	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary	Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;		Explore and compare the differences between things that are living, dead, and things that have never been alive Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Identify and name a variety of plants and animals in their habitats, including microhabitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name sources of food		Recognise that living things can be grouped in a variety of ways Explore and use classification keys to 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	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the life process of reproduction in some plants and animals	Describe 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) Gives reasons for classifying plants and animals based on specific characteristics
Vocabulary	Plant, animal, hear, see, feel, smell	Plant, animal, insect, bird, alive, home, needs, survive, live, similar, different, alike, not alike, compare, here, country, World, far, near		living, dead, never been alive, move, reproduce, sensitive, grow, nutrition, habitat, animal, plant, microhabitat, food, sources, food chain, predator, prey, producer, birth, decay, energy, life cycle, consumption		group, variety, identify, classification, key, environment, kingdom, species, fungi, bacteria, climate change, characteristics, extinction, pollution	mammal, amphibian, insect, bird, reproduction, life cycle, life span, egg, live young, hatchling, fledgling, metamorphosis	classify, classification, groups, characteristic, organism, micro-organism, invertebrates, vertebrates, virus, thorax, arthropod, arachnid, antenna
Topics	**Cycle 1:** Help a wild animal **Cycle 2:** Make a difference	**Cycle 1:** Help a wild animal **Cycle 2:** Make a difference	One Earth	The Secret Garden	Maya Mission			
Plants- Knowledge	Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things	Explore the natural world around them, making observations and drawing pictures of animals and plants;	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees	Observe and describe how seeds and bulbs grow into mature plants Find and describe how plants need water, light and a suitable temperature to grow and stay healthy	Identify and describe the functions of different parts of flowering plants (roots, stem/trunk, leaves and flowers) Explore the requirements of plants for life and growth vary between species (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.			
Vocabulary	Plant, flower, leaf	Plant, leaf, stem, root, petal, flower, tree,	plant, tree, wild, garden, deciduous, evergreen, leaf, stem, flower, roots, component, energy, growth, structure, trunk	seeds, bulbs, grow, mature, healthy, water, light, temperature, optimum, conditions, survival, nutrients, consume, soil	absorb, reproduction, photosynthesis, sunlight, support, anchor, attract, stamen, anther, stigma, filament, style, ovary, petal, sepal, pistil, pollen, pollination, nectar, female, male, fertilisation, wind, seed dispersal, expulsion, transportation			
Topics	**Cycle 1:** -Watch something grow **Cycle 2:** -Grow our own food	**Cycle 1:** -Watch something grow **Cycle 2:** -Grow our own food	Africa One Earth Paddington	Superheroes Protecting the Polar Regions	North for Navigation Archaeology Rocks	Burps, Bottoms and Bile Save our Planet	Astrologists and Biologists Unite	Pig Heart Boy
Animals, including Humans- Knowledge	Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things	Explore the natural world around them, making observations and drawing pictures of animals and plants; Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	Identify and name a variety of common animals, including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amount of different types of food, and hygiene.	Identify that animals, including humans, need the right types and amounts of nutrition, and 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	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators, consumers and prey	Describe the changes as humans develop to old age	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
Vocabulary	Plant, animal, life cycle, environment, habitat	Healthy, unhealthy, clean, dirty, teeth, tongue, gums, hands, fingers, thumbs, palms, fingernails, care, self-care, Animal, legs, paws, claws, feather, fur, sales, body, head, eyes, ears, nose, mouth	energy, growth, habitat, fish, amphibian, reptile, bird, mammal, carnivore, herbivore, omnivore, vertebrate, skeleton, organ, scale, fur, hair, skin, feather, bone, skeleton, live young, egg, cold blooded, warm blooded, pet, teeth, meat, plant, gills, torso, limb, hand, eye, nose, ear, tongue, senses, touch, smell, hearing, taste	offspring, adult, young, human, water, food, air, exercise, nutrients, nutrition, reproduction, diet, survival, hygiene, germs, overweight, underweight, obese, healthy, unhealthy, consumption	protein, carbohydrates, fats, sugar, vitamins, minerals, fruit, vitamin, vegetable, meat, grain, seeds, skeleton, muscle, support, protection, movement, spine, femur, tibia, fibula, radius, ulna, skull, clavicle, ribcage, pelvis, patella, biceps, abdominals, triceps, hamstrings, calves, cartilage, invertebrate	digestion, excretion, peristalsis, anus, duodenum, small intestine, large intestine, stomach, rectum, oesophagus, tongue, saliva, acid, bile, enzymes, functions, incisor, canine, molar, food chain, producer, predator, prey, consumers, producer, primary, secondary, tertiary	develop, grow, change, baby, infant, toddler, child, teenager, adolescent, puberty, adult, geriatric, life cycle, life span, embryo, weaned	circulatory, function, heart, blood vessels, vein, artery, valve, muscle, blood, impact, diet, exercise, drugs, lifestyle, nutrients, transportation, aorta, atrium, capillary, pulse, ventricle, resting heart rate
Topics	**Cycle 1:** Help a wild animal High-five someone in uniform **Cycle 2:** Be a real life hero Grow our own food Have a picnic	**Cycle 1:** Help a wild animal High-five someone in uniform **Cycle 2:** Be a real life hero Grow our own food Have a picnic						Back to the Future

Evolution and Inheritance- Knowledge								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
Vocabulary								inhabited, offspring, identical, adaptation, variation, environment, genes, DNA, evolution, inherit, Charles Darwin, artificial selection, natural selection, advantageous, extinction
Topic			Finding Neverland	Exploring Castles	Archaeology Rocks	Rampaging Romans Save our planet	Crossing the Atlantic	
Materials - Knowledge	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary Talk about the differences in materials and changes they notice	Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	*EVERYDAY MATERIALS* 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	*USES OF EVERYDAY MATERIALS* 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.	*ROCKS* 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	*STATES OF MATTER* Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which materials change state (in Degrees Celsius) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	*PROPERTIES AND CHANGES OF MATERIALS* Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes	

							Explain that some change result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the act of acid on bicarbonate of soda	
Vocabulary	Materials, feel, changes	Melt, change, liquid, hard, soft, prickly, sharp, rough, smooth, squashy, stretchy, roll, mix, knead,	material, object, wood, plastic, glass, metal, paper, water, rock, cardboard, property, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, classify, waterproof, absorption, sort, group, compare, similar, different, matter	suitability, solid, change, squash, bend, twist, stretch, conductor, flexible, rigid, pliable, supple, malleable, multiple uses, purpose, useful, categorise, particular use	sedimentary, igneous, metamorphic, minerals, magma/lava, sediments, permeable, texture, impermeable, weight, pattern, colour, rock, soil, organic matter, fossil, formed, bones, bacteria, dead, decay, sediment, resistant, extinction, weathering, palaeontologist, molten rock, tectonic plate, crust	absorption, solid, liquid, gas, state, degrees celsius, evaporation, condensation, water vapour, water cycle, precipitation, dissolve, particle, temperature, bond, thermometer, sublimation, boiling point	reversible, irreversible, compare, hardness, solubility, transparency, conductivity, insulator magnetism, electrical, thermal, dissolve, solution, particle theory, separate, filter, sieve, evaporate, materials, mix, state, crystallisation, saturation, solvent	
Topic	**Cycle 1:** -Make a sculpture -Float a boat -Fly a kite -Recycle -Roll -Have fun folding **Cycle 2:** -Build -Perform a science experiment -Blow bubbles -Play Pooh sticks -Bake bread -Build a den - Go barefoot	**Cycle 1:** -Make a sculpture -Float a boat -Fly a kite -Recycle -Roll -Have fun folding **Cycle 2:** -Build -Perform a science experiment -Blow bubbles -Play Pooh sticks -Bake bread -Build a den - Go barefoot	Paddington One Earth					
Seasonal Changes- Knowledge		Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies					
Vocabulary		Spring, Summer, Autumn, Winter, change, season, day, night, hot, cod, rain, snow, wind, sun,	season, autumn, winter, spring, summer, weather, rain, snow, fog, sun, cloud, wind, hail, thunder, lightning, dark, light, day, night, long, short, hot, cold, orbit, energy, freezing, melting, reflection					
	Cycle 1: -Watch something grow -Make a blackberry crumble -Discover a new country **Cycle 2:** - grow our own food	**Cycle 1:** -Watch something grow -Make a blackberry crumble -Discover a new country **Cycle 2:** - grow our own food -Discover a new country			Urban Art	Sound and Music		Gallery Rebels

Topic	-Discover a new country							
Light & Sound- Knowledge	Explore how things work.	Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.			*LIGHT* Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change	*SOUND* Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of the sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases		*LIGHT* Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Vocabulary		Light, dark, shine, light source, shadow,			angle, bright, dark, dim, electricity, emits, light, mirror, opaque, reflects, shadow, source, beam, absence, translucent, transparent, reflect, surface, straight, protect, hazardous, long, short, incident ray, photons, image	amplitude, decibel, energy, frequency, medium, power, soundwaves, vibrate, vibrations, air, source, transmit, travel, pitch, volume, high, low, quiet, loud, faint, eardrums, energy		absorb, phenomena, angle of incidence, angle of reflection, refraction, spectrum, periscope
Topic	**Cycle 1:** -Look up -celebrate **Cycle 2:** -Have a feast	**Cycle 1:** -Look up -celebrate **Cycle 2:** -Have a feast			Mechanoid Magnetism North for Navigation		Zeroes to Heroes	
Forces and Magnets- Knowledge	Explore and talk about different forces they can feel Explore how things work.	Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.			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 the two poles of a magnet		Explain that unsupported objects fall towards 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	

					Predict whether two magnets will attract or repel each other depending on which poles are facing			
Vocabulary	Float, sink, stretch, bounce, up, down, snap, break	Pull, push, magnet, materials, metal			force, push, pull, friction, surfaces, materials, contact, magnet, magnetic, non-magnetic, attraction, repulsion, pole, north, south, sliding friction, static friction, resist, elastic		gravity, air resistance, water resistance, mechanisms, lever, pulley, gear, cause, effect, acceleration, buoyancy, effort, force meter, fulcrum, load, mass, Newton, pivot, rigid, streamlined, terminal velocity, weight	
Topic	**Cycle 1:** -Recycle **Cycle 2:** -complete a science experiment	**Cycle 1:** -Recycle **Cycle 2:** -complete a science experiment				Vikings		Back to the Future
Electricity- Knowledge						Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and on/off position of switches Use recognised symbols when representing a simple circuit in a diagram
Vocabulary						appliance, circuit, series circuit, charge, cell, wire, bulb, switch, buzzer, loop, battery, open circuit, closed circuit, conductor, insulator, components, electron, current, static electricity, emit		voltage, negative terminal, positive terminal, parallel circuit, resistance
Topic							Astrologists and Biologists Unite	
Earth and Space- Knowledge		Understand some important processes and changes in the natural world around them,					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	

		including the seasons and changing states of matter..					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	
Vocabulary		Sun, moon, planets, Earth, space					relative, planet, moon, solar system, spherical bodies, rotation, rotate, orbit, day, night, seasons, satellite, eclipse, universe, star, constellation, axis, celestial body, lunar, solar, telescope	