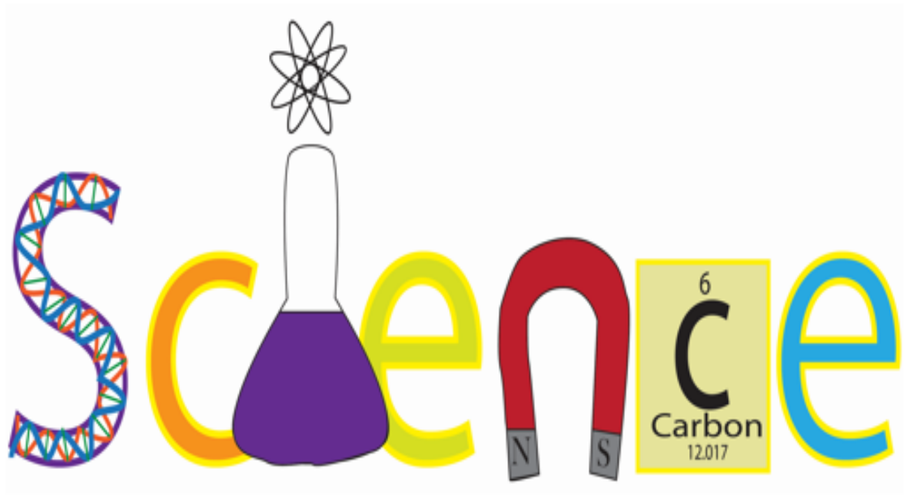
Limitless Dreams,
Endless Opportunities

Science Curriculum



Subject Leader – Alice Whitwam

Subject Specific Planning Documents Science Cycle A

Contents of this scheme of work:

Intent

Science teaching at Manor Park, aims to give all children a strong understanding of the world around them, whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of science - today and for the future. All children are encouraged to develop and use a range of skills including: observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Implementation

In ensuring high standards of teaching and learning in science, we implement a curriculum that is progressive throughout the whole school. Where possible, Science is linked to class topics or a high-quality text, however it is also taught as discrete units and lessons where needed to ensure coverage. We ensure that all children are provided with rich learning experiences that aim to prepare our children for life in an increasingly scientific and technological world. Throughout Science lessons at Manor Park, we want children to acquire a growing understanding of the nature, processes and methods of scientific ideas. We aim to build on natural curiosity and develop a scientific approach to problems; encouraging open-mindedness, self-assessment, perseverance and developing the skills of investigation.

Impact

The impact and measure of this, is to ensure children not only acquire the appropriate age-related knowledge linked to the Science curriculum, but also skills which equip them to progress from their starting points and build links on previously acquired learning. Children at Manor Park, will have a wider variety of skills linked to both scientific knowledge/understanding, and scientific enquiry. Children are consulted about the delivery of science through a regular pupil voice, as we want children to enjoy and be enthusiastic about science in our school. We have a robust, annual monitoring schedule in place, which includes learning walks and book scrutiny – with meaningful feedback provided. Our SLT are kept up to date with developments in the way Science is run in our school, with monitoring updates and evaluated action plans.

Overview of Subject Content

	Autumn	Spring	Summer
Reception	Settling in - All about me	Winter Food Plants & Growing Animals	Toys/Families Journeys
Year 1	Let's go on an animal adventure Biology: Animals including humans	Home Sweet Home Chemistry: Everyday Materials	How does your garden grow? Biology: Plants Earth Science: Seasonal Changes
Year 2	Why did London Burn? Chemistry: Everyday Materials	Ready, Steady, Go! Biology: Animals including humans	Remarkable Rainforests- Biology: Plants/Living Things and their habitats
Year 3/4	Going, going, gone! Biology: Animals including humans	Charging About! Physics: Electricity Chemistry: States of Matter	Crash, Bang, What's that sound? Physics: Sound
Year 5/6	Bright Sparks! Electricity/Light	The Wonder of it all! Animals including humans	Are you a survivor? Evolution & Inheritance

	Progression of substantive knowledge and disciplinary knowledge for Science Cycle A
EYFS links	**Development Matters—Understanding the World** Use senses in exploration of natural materials. • Explore collections of materials with similar / different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds, care for growing plants. • Understand key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural world and all living things. • Explore/talk about different forces they can feel. • Talk about differences between materials and changes they notice. **ELG Understanding the World** • Explore the natural world around them, making observations and drawing pictures of animals / plants • Know some similarities and differences between the natural world around them and contrasting environments, drawing on own experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. **The Natural World** • Describe what they see, hear and feel whilst outside. • Recognize some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.
Key Stage 1 National Curriculum	The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

	Substantive Knowledge	**Disciplinary Knowledge**			
	Children know:	**Asking questions and recognising that they can be answered in different ways**	**Classifying**	**Investigating, Observing and Recording**	**Analysing and evaluating**
Reception	Teach relevant vocab through our topics. Learn about ice melting and when they are baking this also preps them about change of state. To look at materials toys are made from and compare similarities and differences between toys. Children craft with different materials. Topic on growing teaches them about life cycles of e.g., humans, animals, plants. Name body parts and look at changes to them from when they were a baby. Through the plants topic, children learn about parts of a plant and essentials for plant growth. Healthy lifestyles include healthy eating (snack time, making fruit salads and cooking spaghetti Bolognese), teaches children about different foods. There is more emphasis on oral health in the new framework. To look at light, dark and colour through a topic on Divali.	Children can investigate / ask questions about plants and minibeasts in 'wild area' in our outdoor area and the Spinney. There is a 'curiosity box' on the snack table and the item inside changes each week, sometime linked to topic and sometimes not. This often sparks children's interest and leads to conversations and questions.	When using the building blocks which are made from different materials children can sort and organise. Minibeasts / animals teaches classification. Even tidy up time can be considered as scientific e.g., sorting, grouping.	Children become familiar with the world around them through hands on exploration and play. Look for changes to plants in the Spinney throughout the different seasons. During PE and in the outdoor area, the children look at effects of exercise on the body. We have some open-ended resources in continuous provision e.g., gutters, water, sand, magnets, things with wheels where children experiment with forces such as gravity, push/pull, floating/sinking and cause and effect. Investigate the dark in our 'Dark den'.	There are things like old cameras, magnifying glasses, phones etc around the outdoor environment, these encourage children to discuss their knowledge of 'how things work'.

Year 1	**Let's go on an Animal Adventure** **Animals including humans** Match animals to their group (amphibians, reptiles, birds and mammals). Describe a feature of an amphibian, fish, bird, mammal and reptile. Explain what a carnivore, herbivore and an omnivore is. Draw scientific diagrams of different animals and label their features, e.g., scaly skin and gills on a fish. Label parts of the human body. Explain each of their senses.	**Home Sweet Home** **Everyday Materials** Identify different materials Children can find objects that are made out of specific materials, e.g., metal, plastic or wood. Children can say which material they would make a chair, jumper or a window out of. Children can sort materials by their properties. Describe each material and its properties (after investigation). Draw an object and describe the materials and properties. Children can identify if a material is absorbent or not.	**How does your garden grow?** **Plants/Seasonal Changes** Identify some common garden plants and know what a weed is. Name and draw some common trees. Draw and label the parts of a plant. What are the four seasons? Can you describe what we wear in each season and why? Can you describe the weather in winter? What order to the seasons go in? What will happen to puddles on a very cold day? Why?	Ask simple questions and recognise that they can be answered in different ways e.g. Why are flowers different colours? Why do some animals eat meat and others do not?	Identify and classify e.g., Mammals and birds	Use simple equipment to Observe closely and perform simple test. Know whether the test has been successful and can say what has been learned. Gather and record data to help in answering questions	Make a simple written explanation about what has been learned from an investigation or what conclusions have been found. Use their observations and ideas to suggest answers to questions.
Year 2	**London's Burning** **Everyday Materials** Children can identify what an object is made from and link this to its properties. Children can explain which materials would be suitable for building houses Children can sort materials based on their properties. Children can name materials that are stretchy/hard/ strong. Children can identify materials that can be changed by squashing, bending, twisting and stretching.	**Ready, Steady, Go!** **Animals including humans** Children are aware that animals, including humans, have offspring which grow into adults. Children can identify the basic needs of all humans and animals for survival. Children discuss the importance for humans of exercise, food, and hygiene. Children to name things we can do to stay healthy, including teeth.	**Remarkable Rainforests** **Living things and habitats/Plants** Children can identify the difference between things that are living, things that are dead and things that have never been alive. Children understand how different animals are suited to their environments. Children can explain what a 'microhabitat' is. Children are able to explain and order a simple food chain. Children will observe and describe how seeds and bulbs grow into mature plants. Children to plant seeds to show how plants need water, light and a suitable temperature to grow and stay healthy.	Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum e.g. Why do some trees lose their leaves in autumn and others do not? How long are the roots of tall trees? Why do some animals have underground habitats?	Identify, group and classify according to a given criteria e.g., natural or man-made materials.	Perform simple comparative and fair tests e.g., finding out how seeds grow best or which material is suited to a given purpose. Use simple equipment to observe closely. Gather and record data to help in answering questions including from secondary sources of information using drawings, labelled diagrams, block graphs or tables.	Communicate his/her ideas, what he/she does and what he/she finds out in a variety of ways e.g., simple written reports or write ups. Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns.

Key Stage 2 National Curriculum	**Lower key stage 2** The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge. **Upper key stage 2** The principal focus of science teaching in is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. 'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly.

Substantive Knowledge				Disciplinary Knowledge			
	Children know			Asking Questions	Classifying	Investigating, Observing and Recording	Analysing and Evaluating
Year 3/4	**Going, going, gone! Animals including humans** Know which animals do not have a skeleton. Explain that muscles in the human are arranged in pairs. Explain what our bones do. Explain how a healthy diet keeps our bodies healthy. Label the parts of the body central to digesting food. Put in order the processes involved in digesting food. Describe and order a food chain and label the primary consumer, secondary consumer and tertiary consumer. Explain the function of different types of teeth.	**Charging About! Electricity States of Matter** The children can identify common appliances which run on electricity. The children are able to explain why the human body is a good conductor of electricity. Children can explain why this makes electricity very dangerous. The children are able to draw and label a series circuit. The children can draw and label a parallel circuit. 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. Working In a group, the children are able to build a circuit where each of the bulbs can be switched on/ off independently. Recognize that a switch opens and closes a circuit. The children are able to explain why the circuit worked. Recognise some common conductors and insulators, and associate metals with being good conductors. Children will compare and group materials together, according to whether they are solids, liquids or gases. Explain that some materials change state when they are heated or cooled. Describe the part played by evaporation and condensation in the water cycle. Link the rate of evaporation with temperature. Start to become aware that all matter (stuff) in the universe is made up of tiny building blocks. The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g., hot/cold, soft/hard, light/heavy, etc.).	**Crash, Bang, What's that sound! Sound** Children can identify different sources of sound. Children can explain what sound is. Children can explain how sounds are made. Children can explain why different musical instruments make different sounds. Understand the link between sounds and vibration. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Explain why sounds get fainter as the distance from the sound source increases.	Ask relevant questions and use different types of scientific enquiries to answer them e.g. Why does the moon appear as different shapes in the night sky? Why do shadows change during the day? Where does a fossil come from? Why are steam and ice the same thing? Why is the liver important in the digestive system? What do we mean by pitch when it comes to sound?	Group information according to common factors e.g., plants that grow in woodlands/ plants that grow in gardens. (Yr 3 focus) e.g., Venn Diagrams with bisecting sets or Carroll Diagrams Group information according to common factors e.g., materials that make good conductors or insulators. (Yr4 focus) e.g., Venn Diagrams with bisecting sets or Carroll Diagrams	Set up simple practical enquiries, comparative and fair tests e.g. To see which type of soil is most suitable when growing two similar plants? To see if their right hand is as efficient as their left. Set up a fair test with different variables e.g., the best conditions for a plant to grow. Can explain to a partner why a test is a fair one. Set up simple practical enquiries, comparative and fair tests e.g. Which of two instruments make the highest or lowest sound and does a glass of ice weigh more than a glass of water? Set up a fair test with more than one variable e.g., using different materials to cut out sound. Can explain to others why a test is fair e.g., discover how fast ice melts in different temps. Gather, record, classify and present data in a variety of ways to help in answering questions drawings, labelled diagrams, keys and child constructed bar charts and tables Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	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 .

		Children will start to understand that all matter can change if the arrangement of these building blocks changes.					
Year 5/6	**Bright Sparks!** **Electricity** **Light** Conductors have free electrons and when electrical current flows through a conductor, the electrons move like people in a queue. A chemical reaction inside a cell produces the charged particles that can flow around a circuit. That an electrical current can only flow if there is complete circuit. The symbols for the components in an electrical circuit. Children can: Draw and build simple circuits. Fix broken circuits so that a bulb will light up. Use recognised symbols when representing a simple circuit in a diagram 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. Identify light sources Draw on a diagram the correct path of the ray of light for a	**Are you a survivor?** **Evolution and Inheritance** Children can explain why living things have specific adaptations that help them survive in their habitats. Explain the process of evolution. The children are able to explain the difference between inherited and acquired characteristics. Explain how fossils are created. To be able to explain what has been discovered through studying fossils. Recognise that living things have changed over time Understand that living things produce offspring of the same kind, but they are not identical to their parents Identify how animals and plants are adapted to suit their environment and that adaptation may lead to evolution.	**The Wonder of it all!** **Animals including humans** To be able to name the major parts of the circulatory system. Conduct scientific investigations over a longer period of time, gathering data, finding averages and making predictions. Present findings of the scientific investigations in charts and graphs Describe the changes as humans develop to old age. Identify and name the main parts of the human circulatory system. Describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function Explain how nutrients and water are transported within animals, including humans.	Plan different types of scientific enquires to answer given questions Plan different types of scientific enquiries to answer their own or others' questions.	Group and classify things and recognise patterns using appropriate ways of presenting e.g., classification keys.	Know which type of investigation is needed to suit a particular scientific enquiry e.g. Looking at the relationship between pulse and exercise. Set up a fair test when needed e.g. Does light travel in straight lines? Know how to set up an enquiry-based investigation e.g. What is the relationship between oxygen and blood? Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (including capacity, mass, ratio and proportion)	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 Use results to draw conclusions. Is evaluative when explaining findings from scientific enquiries and is clear about what has happened in recent enquiries and can relate this to other enquiries where appropriate

	person to see an object Describe how the size of a shadow changes as an opaque object is moved closer or further away from a light source. To be able to explain that white light is made of different colours of light. Draw lines on a diagram to explain how a person sees an object through a periscope. Use the idea that light travels in straight lines to explain how we see things. 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.						

Curriculum End Points – Science

The end points for each year group show how children apply the knowledge, skills and understanding they are taught before moving on with their learning.

Year 1 – Cycle A		
Animals including humans – Biology	Everyday Materials - Chemistry	Plants – Biology Seasonal Changes – Earth Science
Children can: Identify human body parts Say which of the senses each body part uses Ask simple questions about the human body Identify and classify animals into the following groups – mammals, amphibians, reptiles, birds and fish Explain what an omnivore, carnivore and herbivore is and be able to name an example of each	Children can: Identify different materials Find objects that are made out of specific materials Say which material they would make a chair, jumper or a window out of. Sort materials by their properties. Compare and group materials according to their properties	Children can: Talk about how the days and weather change through the year? Name the four seasons and talk about how they are different List the order of the seasons Identify some common garden plants and know what a weed is. Name and draw some common trees. Draw and label the parts of a plant.
Year 2 – Cycle A		
Everyday Materials - Chemistry	Animals including humans - Biology	Plants/Living things and their habitats - Biology
Children can: Identify what an object is made of Sort materials based on their properties Perform simple tests with equipment to make comparisons between materials and suitability for different purposes Test and record how different materials can be changed.	Children can: Explain the basic needs of all humans and animals. Name the basic food groups and know how they help our bodies. Name things we can do to stay healthy. Name the offspring of different animals	Children can: Explain what plants need to grow. Explain how plants make their own food. Understand what seeds are and how they help a plant. Explain and order a simple food chain. Understand how different animals are suited to their environments. Explain what a ‘microhabitat’ is

Years 3 and 4 – Cycle A

Animals including humans Biology		Electricity Physics	States of Matter Chemistry	Sound Physics	
Children can: Identify which animals do not have a skeleton Explain how muscles and bones work in the human body Explain how a healthy diet keeps our bodies healthy. Label and order the process of food digestion Explain the function of different types of teeth		Children can: Draw and label a series and parallel circuit Construct a simple series electrical circuit, Build a circuit where each of the bulbs can be switched on/ off independently. Describe how a switch can be used to open and close a circuit. Recognise some common conductors and insulators, and associate metals with being good conductors	Children can: Name the three states of matter. Describe the qualities of different solids, liquids and gases. Describe how solids, liquids and gases behave. Explain the process of melting and freezing. Identify condensation and evaporation in the water cycle.		Children can: Explain what sound is and how sounds are made. Explain the link between sounds and vibration. Describe how we hear things and why sounds get fainter as the distance from the sound source changes

Years 5 and 6 – Cycle A

Electricity Physics	Light Physics	Animals including humans Biology	Evolution and Inheritance- Biology
Children can: Explain that an electrical current can only flow if there is complete circuit. Draw and build simple circuits and fix broken circuits so that a bulb will light up. Use recognised symbols when representing a simple circuit in a diagram Discuss how to make a bulb brighter or a buzzer louder	Children can: Explain how we see things from light sources to our eyes Describe how the size of a shadow changes as an opaque object is moved closer or further away from a light source. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	Children can: Describe the changes to humans as they develop to old age. Identify and name the main parts of the human circulatory system. Describe the functions of the heart, blood vessels and blood Discuss the impact of diet, exercise, drugs and lifestyle on the way their bodies function Explain how nutrients and water are transported within animals, including humans.	Children can: Explain the process of evolution. Explain the difference between inherited and acquired characteristics. Talk about fossils – what it is, how it is created and the information they provide how fossils are created. Recognise that living things produce offspring of the same kind, but they are not identical to their parents Identify how animals and plants are adapted to suit their environment and that adaptation may lead to evolution.

Animals including humans: Let's go on an animal adventure: Make observations using their senses. Identify and name a variety of animals.

Year One

Everyday Materials: Is your home a sweet home? Distinguish between an object and the material from which it is made.

Plants – seasonal changes: How does your garden grow? Identify and name a variety of common wild and garden plants.

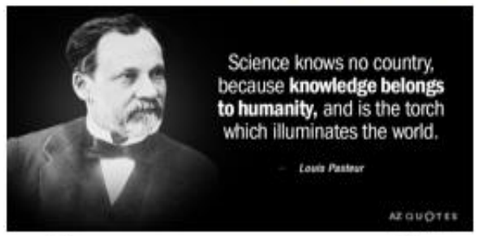
Everyday Materials: London's Burning Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Year Two

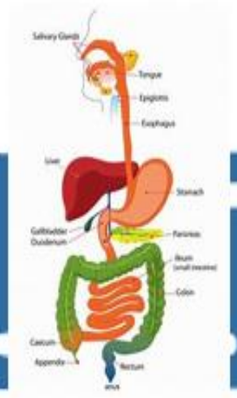
Animals including humans: Ready, steady, go! Investigate animals including humans – baby to adult, basic needs to survive, exercise, food and hygiene.

The national curriculum for science aims to ensure that all pupils:

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



Animals including humans: Going, going, gone!/Identify that humans need the right type of nutrition. Describe the simple functions of the basic parts of the digestive system in humans .



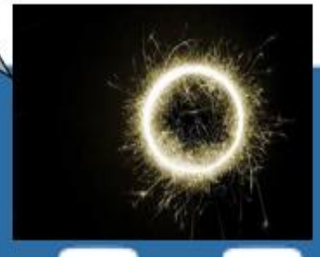
Plants, living things & their habitats, Remarkable Rainforest! Investigate living things and habitats in the Spinney and rainforest. Compare living and non-living habitats.

Year Three/Four

Electricity: Charging about! Identify common appliances which run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts.

Sound: Crash, Bang, What's that sound? Identify how sounds are made and vibrations from sounds travel through a medium to the ear.

Electricity & Light: Bright Sparks! Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.



Year Five/six

Animals including humans: The Wonder of it all: Describe the changes as humans develop to old age. Name & label the main parts of the human circulatory system.

Evolution & Inheritance: Are you a survivor? Describe how living things are classified into broad groups according to common observable characteristics.

MANOR PARK SCHOOL & NURSERY

Manor Park Primary School Curriculum

Road Map- Science Cycle A