Enfield Heights ACADEMY

Science

Knowledge and Skills Sequencing Document

Science National Curriculum Aims
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

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	Science
Intent	**To enhance children's inquisitive nature and understand how science impacts our world and the future.** Biology, chemistry and physics are sequenced and linked across the school with a focus on scientific enquiry. Children will develop a love of science and an ability to plan, observe, record, conclude and evaluate. From reception to year six children will discover the wonders of science, develop scientific knowledge and conceptual understanding, be able to question, reason and make links to the world around them.

	Science Knowledge and Skills Progression					
Curriculum Driver	Reading and Force for Positive Change					
Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception		**Winter**		**Growing**		**Under the Sea and at the Seaside**
		The Natural World		The Natural World		The Natural World
Seasonal Changes (taking weather measurements on a weekly basis) Plants (naming plants weekly) Animals including humans (naming and identifying birds in the playground weekly if you spot any)						
Y1	**What's that weather?**	**Toy Story; to infinity and beyond**	**London's Burning**	**Animal Kingdom**	**Secret Garden**	**There's No Place Like Home** (Local)
	Seasonal Changes	Everyday Materials *Autumn week*	Animals including humans (parts of the body and senses) *Winter Week*	Animals, including Humans (Naming fish, animals, reptiles, birds etc.) *Spring Week*	Plants	Seasons and plants summary *Summer week*

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Living things and their habitat (naming and identifying plants and animals in the playground half termly) Plants (growing seeds and bulbs outside at the relevant time and observing, measuring and comparing how they grow)						
Y2	**Who are we?**	**Gunpowder, Treason and Plot**	**Kings and Queens**	**Spring has Sprung**	**Reduce, Reuse, Recycle**	**A Pirate's Life for Me (Local/Global)**
	Living things and their habitats *Planting bulbs*	Animals including humans with a focus on animals *Observe bulbs*	Materials *Observe bulbs*	Animals including humans with a focus on humans *Plant seeds inside*	Materials *Plant seed outside*	Plants and living things summary
Plants (gathering evidence of life cycles) half termly						
Y3	**Let There Be Light**	**Stones and Bones**	**May The Force Be With You**	**Extreme Earth**	**Let It Grow**	**Groovy Greeks**
	Light	Forces and magnets	Forces and Magnets	Rocks	Plants (Spring) *Function of ther parts of a plant* *Conditions for life and growth*	Animals including humans *Plants summary* *Life cycle of flowering plant (having observed it over the year)*
Living things and their habitats (naming and identifying living things in the local environment)-half termly						
Y4	**Invaders and Settlers: Romans (National)**	**Our Changing world(x2)**	**Invaders and Settlers: Anglo Saxons & Vikings**	**Buzzers, Bulbs and Batteries**	**Dem Bones Dem Bones**	**Viva Espana**
	Living things and their habitats	Living things and their habitats States of Matter	States of matter	Electricity	Animals, including humans	Sound Living things and their habitats summary (summarising the changes in the school grounds over the year)

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Y5	**Food Glorious Food**	**Early Civilizations (Global)**	**The Rainforest**	**Earth and Space**	**African Kingdom: Benin kingdom**	**Ancient Egypt**
	Properties of materials	Changes of materials	Living things and their habitats	Earth and Space	Animals including humans Forces	Forces
Y6	**Evolution and Inheritance**	**CSEye Investigates (x2)**	**WW2**	**World War 2**	**Empire and Enfield (Local)**	**Fit and Fabulous**
	Evolution and Inheritance (Variation, inheritance and adaptation)	Light	Light and Electricity	Living things	Evolution and inheritance (Evolution)	Animals Including Humans

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Year 3			
Learning Journey		**Key Knowledge**	**Key Vocabulary**
Let there be light		• Know that we see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. • Know that some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. • Know that the light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. • Know that shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. • Know that the size of the shadow depends on the position of the source, object and surface.	Light, dark, absence of light, reflect, reflection, sun, shadows, blocked, see, light source, opaque, transparent, translucent, shiny, matt, surface, mirror, sunlight, dangerous
Science Domain	Physics		
National Curriculum Content	• 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 eye. • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change **Year Group Links:** YR: Seasons Y1: Seasonal change		
Force for Positive Change			

Science Skills	**Skill Assessment**
Planning	• Children ask relevant questions and independently use a range of question stems and answer these questions. • The children answer questions posed by the teacher. E.g How is a shadow made? • Given a range of resources the children decide for themselves how to gather evidence to answer questions. • They can explain what type of enquiry they have used
Observing	• They make relevant and careful observations of the planned variable E.g observe what happens to the size of a shadow as a torch is moved further away from an object • They use a range of equipment for measuring length e.g the size of the shadow. They use standards units of measure. (mm,cm,m) • With support they repeat an observation or measurement.
Recording	• Record findings using simple scientific language, photographs, drawings, labelled diagrams, bar charts and tables E.g labelled photographs of the object's shadows.
Concluding	• With increasing independence, children draw conclusions based on their evidence reporting their findings through oral and written accounts. E.g the shadow was bigger because… • They use evidence to support or contradict a prediction. E.g this shows that my prediction was correct/incorrect because… • The children ask further questions which can be answered by extending the same enquiry. Eg. Choose suitable materials to make shadow puppets or explore shadows which are connected and disconnected from the object e.g shadows of clouds and children in the playground.
Evaluating	• Explain the accuracy of their data. • Can say whether what has happened is what they predicted/expected • They identify ways in which they adapted their method as they progressed or how they would do it differently.
Possible enquires:	
Identifying, classifying and grouping	How can I classify light sources? (leading to man- made/m=natural. How can I classify materials? (leading to reflective/non reflective, transparent/translucent/opaque)
Observing Over Time	
Pattern Seeking	

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Comparative and Fair Testing	How does the number of layers of transparent plastic affect how much light can pass through? How does the position of a light source effect the size of a shadow?
Researching	

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Year 3			
Learning Journey		**Key Knowledge**	**Key Vocabulary**
May the force be with you		• Know that a force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. • Know that a magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. • Know that the strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. • Know that for some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.	Force, move, push, pull, twist, contact force, non-contact force, magnet, magnetic force, strength, bar magnet, ring magnet, horseshoe magnet, magnetic material, north pole, south pole, attract, repel, iron, steel,
Science Domain	Physics		
National Curriculum Content	• 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 • predict whether two magnets will attract or repel each other, depending on which poles are facing. **Year Group Links:** Y2: Squashing, twisting, bending, stretching (Reduce, Reuse, Recycle)		
Force for Positive Change			

Science Skills	**Skill Assessment**
Planning	• Children use a range of question stems and answer these questions such as What happens to../when, How does…If we… • The children answer questions posed by the teacher. E.g Are all metals magnetic? • Given a range of resources the children decide for themselves how to gather evidence to answer questions.
Observing	• They make relevant and careful observations of the planned variable . E.g observe how different objects behave with magnets • They use a range of equipment for measuring length E.g which material allows a car to travel the furthest?/How far does the car move on different surfaces? • With support repeat a reading
Recording	• Where appropriate, the children can decide how to record and present evidence. • Record findings using simple scientific language, photographs, drawings, labelled diagrams, bar charts and tables E.g create a bar chart showing the distance a car travelled on different materials.
Concluding	• Say whether what has happened is what they predicted/expected • Following a scientific experience, children ask further questions which can be answered by extending the same enquiry.
Evaluating	• Explain their accuracy of their data • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.
Possible enquires:	
Identifying, classifying and grouping	• Based on the children's own criteria, can the children sort different materials? (Leading towards Which materials are metal/non-metal and magnetic/non magnetic) • Based on children's own criteria, can the children sort toys (leading to what makes them move e.g push and pull)
Observing Over Time	

Pattern Seeking	
Comparative and Fair Testing	• How do objects move on different surfaces? What affects the movement of a toy car? • Does the size of the magnet affect how many paperclips can be picked up? • How do magnets behave at a distance? E.g through the table, in water
Researching	How are magnets used in every day life?

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Year 3			
Learning Journey		**Key Knowledge**	**Key Vocabulary**
Extreme Earth		• Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. • Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water	Rocks, soil, sedimentary, igneous, metamorphic, fossils, organic matter, sand, pebbles, permeable, impermeable, absorb, pressure, crystals, sandstone, granite, limestone, chalk, soil, slate, peat, sandy/chalk/clay soil
Science Domain	Physics		
National Curriculum Content	• 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 **Year Group Links:** Y2: Everyday materials		
Force for Positive Change			

Science Skills	**Skill Assessment**
Planning	• Children use a range of question stems and answer these questions such as What happens to../when, How does…If we… • The children answer questions posed by the teacher. E.g. What are fossils? • Given a range of resources the children decide for themselves how to gather evidence to answer questions. E.g different rocks in trays/different soils, water and beakers
Observing	• They make relevant and careful observations of the planned variable. E.g. watching the water flow through the soil • They use a range of equipment to take measurements. E.g. beakers
Recording	• Where appropriate, the children can decide how to record and present evidence. • Record findings using simple scientific language, photographs, drawings, labelled diagrams, bar charts and tables E.g sketch different rocks and describe them, drawing of soil jar with separated soil parts – all labelled
Concluding	• With increasing independence, children draw conclusions based on their evidence reporting on their findings through oral and written accounts. • They use straightforward scientific evidence to answer questions or to support findings. • Say whether what has happened is what they predicted/expected • Children ask further questions which can be answered by extending the same enquiry. Eg. Which soil retains water the best
Evaluating	• Explain their accuracy of their data • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry? They explain the accuracy of their data and if their prediction was correct. E.g. The clay soil…..water..
Possible enquires:	
Identifying, classifying and grouping	• Can you use the identification key to find out the names of each of the rocks in your collection? • How are the soils different or similar?
Observing Over Time	• How does soil separate into different layers? (I a jar: Gravel, sand, silt, fine clay and organic matter and water)
Pattern Seeking	

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Comparative and Fair Testing	• Which rocks are the hardest? (How could we test the hardness of rocks) • Which rocks absorb the most water? (How could we test how absorbent a rock is? • Which type of soil allows water to run through it the quickest?
Researching	• Who was Mary Anning and what did she discover? (She discovered fossils) How are fossils formed? • How do rocks change over time? (books, you tube clips of buildings they know – then and now)

Year 3

Learning Journey		Key Knowledge	Key Vocabulary
Let it grow		• Know that plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. • Know that plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind, animal, water) Grow, plant, roots, stem, trunk, leaves, flower, seed, bulb, function, air, light, water, nutrients, soil, life, transported, life cycle
Science Domain	Biology		
National Curriculum Content	• 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 (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 **Year Group Links:** YR: Naming common plants /Planting and observing growth Y1: Plants, survival and classification		
Force for Positive Change			

Science Skills	Skill Assessment
Planning	• Children ask relevant questions and independently use a range of question stems and answer these questions. E.g. What happens to a plant when/if… How do plants… • The children answer questions posed by the teacher. E.g. What happens to celery when left in coloured water? • Given a range of resources the children decide for themselves how to gather evidence to answer questions. E.g. where to put a plant • They can explain what type of enquiry they have used. E.g. Observing over time
Observing	• They make relevant and careful observations of the planned variable. E.g. observe the effect of putting white carnations in coloured water or what happens to a plant when the leaves or roots are removed. • They use a range of equipment to take accurate measurements using standard units E.g. beakers, thermometers
Recording	• Where appropriate, the children can decide how to record and present evidence. • Record findings using simple scientific language, photographs, drawings, labelled diagrams, bar charts and tables E.g. photos of the results of plants in the different conditions

Concluding	• With increasing independence, children draw conclusions based on their evidence reporting their findings through oral and written accounts. E.g. the plants needs …. because in the dark the plant… • They use straightforward scientific evidence to answer questions or to support findings. E.g. this shows that… • Children ask further questions which can be answered by extending the same enquiry. Eg. Why do different plants grow in different ways?
Evaluating	• Explain the accuracy of their data • They identify ways in which they adapted their methods as they progressed or how they would do it differently if they repeated the enquiry.
Possible enquires:	
Identifying, classifying and grouping	• How many different ways can you group our seed collection? (could be how they are dispersed)
Observing Over Time	• Observe celery (with roots and leaves) in coloured water and/or white carnations in coloured water.
Pattern Seeking	
Comparative and Fair Testing	•
Researching	• Different methods of seed dispersal and pollination

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Year 3			
Learning Journey		**Key Knowledge**	**Key Vocabulary**
Animals including humans		• Know that animals, need to eat (from the different food groups) in order to get the nutrients they need for the body to stay healthy • Know that humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.	Nutrition, carbohydrates, sugars, protein, vitamins, minerals, fibre, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints
Science Domain	**Biology**		
National Curriculum Content	• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some animals have skeletons and muscles for support, protection and movement **Year Group Links:** Y1: Labelling basic human body parts Y2: Food groups and exercise		
Force for Positive Change			

Science Skills	**Skill Assessment**
Planning	• Children ask relevant questions and independently use a range of question stems and answer these questions. What happens when…How do/does…If we… • The children answer questions posed by the teacher. E.g. What is the difference between producers, predators and prey? • Given a range of resources the children decide for themselves how to gather evidence to answer questions. • With support, they recognise when secondary sources can be used to answer questions that cannot be answered through practical work. • They can explain what type of enquiry they have used.
Observing	• They make systematic and careful observations. E.g. give examples of bones related to different parts of the body. Examine their features closely and identify evidence of how they might fit together..
Recording	• Where appropriate, the children can decide how to record and present evidence. • Record findings using simple scientific language, photographs, drawings, labelled diagrams, bar charts and tables. E.g Construct a 2D model of the skeleton with their partner's bodies to position parts correctly and labelling as many bones as possible with post it notes
Concluding	• With increasing independence children draw conclusions based on their evidence reporting their findings through oral and written accounts. E.g. If we didn't have a skeleton… • They use straightforward scientific evidence to answer questions or to support findings. • Children ask further questions which can be answered by extending the same enquiry. Eg. Do all animals have skeletons?
Evaluating	•
Possible enquires:	
Identifying, classifying and grouping	• Compare and contrast different types of teeth/jaw bones- How can we organise teeth/jaw bones into groups? (linking to their function in aid of making a food chain
Observing Over Time	•
Pattern Seeking	•

Comparative and Fair Testing	•
Researching	• Use secondary sources to identify what different animals in a particular habitat/environment in order to construct a food chain. • Research part of the digestive system (Present in different ways)