Science programmes of study: KS 1 and 2

What do we aim to achieve? (Our intent)

*Our Science curriculum aims to provide our children with the foundations for understanding the world around them, and equip them with a range of skills and knowledge so that they learn how to **ask questions and investigate**.*

*As Scientists, our children will **work scientifically. They will** develop knowledge and understanding about the use and suitability of **materials** and the **changing states of materials;** they will recognise **plants and trees**, their names, parts and growing requirements, pollination and seed dispersal. They will study **animals, including humans,** their body parts, the 5 senses, and needs (including exercise, healthy eating and hygiene). They will study the digestive system and teeth. They will learn about food chains, and **living things and their habitats**, including naming things that are living, dead or have never been alive. They will group and classify. As scientists they will investigate how **sound** travels, how **light** is the absence of darkness and how shadows are made. They will compare and group **rocks**, learning how fossils are created and how soil is composed. Through **forces and magnets** they will observe how poles attract and repel, and which objects are attracted. They will learn how **electricity** flows and how to make circuits that work.*

How do we do it? (Our implementation)

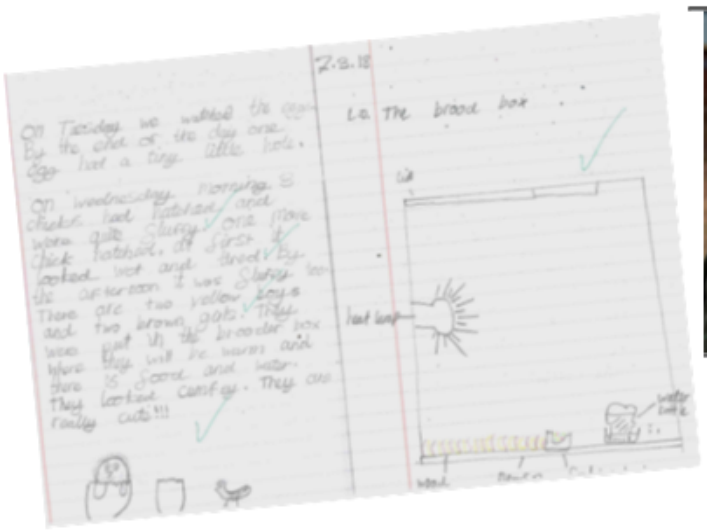
The children will develop these skills over our two year rolling programme.They will use discussion, simple equipment, video clips and photographs when carrying out their investigations, including exploring the school grounds and researching online. They will make use of writing, labelled drawings and simple charts to demonstrate their knowledge and understanding.
In lessons they will be encouraged to:

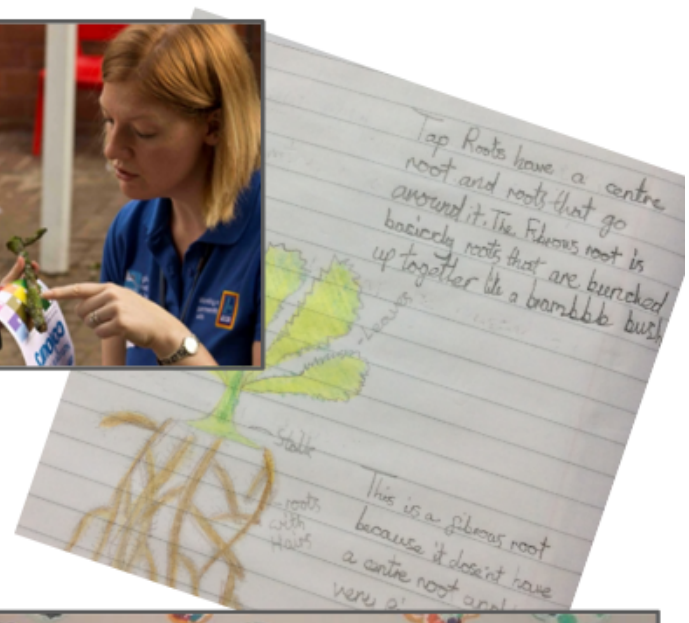
- *make first hand observations and use these to answer questions*
- *use secondary sources*
- *sort, classify and identify*
- *perform simple tests and record data*
- *predict, compare and make conclusions*

What happens as a result of this learning? (Our impact)

The impact** of our programme of study is that our children **develop a sense of excitement and curiosity** about their world, and understand how science can be used to **explain what is occurring, and predict how things will behave.

Look what we have been learning about





Science programmes of study: KS 1 and 2

YEAR A	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Theme	All About Me	Winter Wonderland	Superheroes	Minibeasts	Around the World in 30 Days	On the Farm
EYFS	How the **body changes** as we grow. **Labelling human body** parts. **Healthy lifestyles** (diet & exercise) What purpose do they have? Using our five **senses** to explore the world around us. **Daily weather update.** **Autumn walk** - changes to weather & environment.	Planting **bulbs/seeds** in an outdoor planter. Exploring **light & dark/night & day**. **Materials** - what will keep us warm and dry in winter? **Polar animals** - how they have adapted to harsh environments. **Daily weather update**. **Winter walk** - changes to weather & environment.	How to keep **fit & healthy** like a superhero. How can we **help save our planet**? (impact of plastic waste affecting **animals**). Litter picking on school grounds. **Daily weather update.** **Freezing/melting** (how can we free the vegetables?) **Making pancakes** (observe changes to ingredients)	**Minibeasts - name and identify** habitat, diet (omnivore/herbivore/carnivore), appearance. **Lifecycle** of a hen &/or butterfly. **Grass experiment** - grow grass seed in different conditions. **Baking** butterfly cakes (observe changes to ingredients). **Daily weather update.** **Spring walk** - changes to weather & environment.	**Animals** from around the world (habitats, appearance/patterns). **Rainforests** (weather, animals, plants/trees). **Baking bread** (observe changes to ingredients). **Daily weather update.** **Summer walk** - changes to weather & environment. Exploring **magnets** - what objects attract/repel and why? (continuous provision).	**Farm animals** and their young - **name.** Animals that hatch from an **egg.** **Feathers** and their uses, observe with magnifying glass. **Sun safety** - sunglasses, long sleeved clothing, seek shade etc. **Making veg soup** (observe changes to ingredients) **Daily weather update.**

What does each lesson cover and how does it link together over time? **NC aims for Key Stages 1 (Years 1 and 2) and 2 (Years 3-4):**

S1: develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics (describe processes and key characteristics; build up specialist vocabulary; apply mathematical knowledge by collecting, presenting and analysing data)

S2: 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 (working scientifically; observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing - controlled investigations; seeking answers to questions)

S3 are equipped with the scientific knowledge required to understand the **uses and implications of science**, today and for the future.

Theme	TOYS		HOUSES AND HOMES		TRAVEL THE WORLD	
KS1 (Yr 1 & 2)	**Animals including humans; healthy bodies** **Changes over time –** using baby photos to observe changes **Measuring body parts** - to look for pattern and analyse data **Exploring human senses –** investigate hearing extending questioning and looking for pattern **Importance of a healthy diet -** making sensible choices and what we need to survive.	**Seasonal changes** **Observing the weather-** looking at weather and temperature use phrases a forecaster would use, is it seasonal **Changes in weather** - Wind and rain, make a wind sock and weather vane look at the effect rainfall has, make rain catcher Day length -looking at changes by day and over season, look at shadows and how they change during day.	**Uses of everyday materials: building materials.** **Materials** - explore a range of materials used in building, why are they good for their purpose? Natural / man made? **Link to history**- how building materials change over time and why? **Waterproof** - why is being waterproof important? **Investigate** waterproofing.	**Plants: pea diary: Living things: life cycles** **Identify plants-** in the garden and predicting what they could grow into. **Keep a bean or pea diary** - observe changes as they grow. **Plant chitted potatoes –** predict what will happen understand what they need to grow. **Plant cress** – subject to light and dark and compare differences	**Living things and their habitats: classification; animals** **Common animals** - classify & group (carnivore / amphibian,etc). **Research habitats & food chains**. **Offspring growing to adults** – adults have offspring, changes over time **Link to African animals**- geography.	**Animals including humans; healthy bodies** **Research habitats & food chains**. Observing, creating, understanding **Exploring differences between living, dead and never been alive** - categorising
Theme	ROTTEN ROMANS		AMAZING ANGLO-SAXONS		INCREDIBLE INDIA	
KS2 (Yr 3 & 4)	**Animals including humans: Fitness for success** **Nutrition, diet and healthy lifestyles.** **Human body** - skeletons, bones, muscles and lungs, Fitness and exercise **How are humans and animals similar?** – Investigative skills.	**Plants: Greatly green growers** **Growing conditions** -light, dark, water, soil **Parts of a plant -** identify and label diagram incl. anther, sepal **Edible plants (vegetables)**	**Forces and magnets:Magnetic fun and games** **Pushes and pulls** and the direction of forces **How surfaces can affect forces** – Investigative skills. **Magnets and compasses -** magnetic and non-magnetic materials, **attraction and repulsion** – poles. **Use of magnets in everyday life**	**Rocks: This planet rocks** **Types of rocks and their properties -** texture, colour and uses of rocks. **Fossils** - describe how fossils are formed. Recognise that **soils** are made from rocks & organic matter. **Strength of different types of rocks** – Investigative skills. **Materials** including rocks and their uses	**Living things and their habitats**:**Habitat helpers** **Our environment** **Climate change** - positive and negative examples of human impact. **Categorising plants** (flowering and non flowering). **Helping our habitats.** **Having a positive impact** – investigative skills.	**Light: Shining the light** **Darkness as absence of light**. **Reflecting light off different surfaces.** Different **materials** and reflection. **Reflection** using mirrors **Shadows –** Investigative skills. **The sun.** **Translucent, opaque and transparent** objects

How does all this build on their learning from the Early Years?

Foundation Stage Profile	Understanding the World	The Natural World	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 experience 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.
		People, Culture and Communities	Describe their immediate environment using knowledge from observation, discussion, stories and non-fiction texts.

YEAR B	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Theme	All about Me	Fabulous Festivals	Dinosaurs	Traditional Tales	Transport	Pirates/ Under the Sea
EYFS	How the **body changes** as we grow. **Labelling human body** parts. **Healthy lifestyles** (diet & exercise) What purpose do they have? Using our five **senses** to explore the world around us. **Daily weather update.** **Autumn walk** - changes to weather & environment.	Planting **bulbs/seeds** in an outdoor planter. Exploring **light & dark/night & day**. **Materials** - what will keep us warm and dry in winter? **Daily weather update**. **Winter walk** - changes to weather & environment.	**Dinosaurs - name & identify,** diet (omnivore/carnivore/herbivore), appearance. Formation of **fossils**. What other animals hatch from an **egg**? How can we **help save our planet**? (impact of plastic waste affecting **animals**). Litter picking on school grounds. **Making pancakes** (observe changes to ingredients) **Daily weather update.**	**Life-cycle** of a hen &/or butterfly. **Grass experiment** - grow grass seed in different conditions. **Baking gingerbread** (observe changes to ingredients). **Materials experiment** - which materials would be suitable to build a house? **Daily weather update.** **Spring walk** - changes to weather & environment.	**Hedgehogs** - diet, habitat, facts. What does **hibernation** mean? **Rice Krispie traffic lights** (observe changes to ingredients). **Daily weather update.** **Summer walk** - changes to weather & environment. Exploring **magnets** - what objects attract/repel and why? (continuous provision).	**Floating & sinking** - which objects float/sink and why? **Sea creatures** - diet, habitat, facts. **Freezing/melting.** Making and **cooking fish cakes** (observe changes). **Sun safety** - sunglasses, long sleeved clothing, seek shade etc. **Daily weather update**.

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Theme	FAMOUS PEOPLE WHO CHANGED OUR LIVES		LONDON		EXPLORE THE WORLD	
KS1 (Yr 1 & 2)	**Animals including humans** **People and their pets**- what do living things need to live, how to be healthy. **Research woodlice** - needs, habitat, and life-cycle. **Design and make a micro habitat** for woodlouse in class garden.	**Seasonal changes** **Seasons-** changes in weather. Linking weather conditions and hibernation **Changes in weather** - Wind and Sun make a wind sock and spinner and investigate. Sun-catchers and investigated how shadows were formed.	**Everyday materials** **Identify/name different materials -** recognise properties make them fit for purpose- metal for keys etc. Use **language** to describe properties-bendy, stretchy. **Explore magnets –** investigate, explore and problem solve.	**Plants:plant materials** **Daffodils -** flower parts, bulb as food storage. **Seeds** - Look closely at different seeds: explore dispersal, different size, shape etc. **Plant investigation**- look at plants under a microscopre photograph, draw and label **Understand the basic structure of a tree**	**Everyday Materials: exploring changes** Help in the garden and **Identify chages in ice over time** as it melts.. **Consider how to speed up or slow doen the melting process** and how this is useful. **Investigate puddles** - identify changes overtime. **Explore wax. –** properties and characteristics	**Animals including humans - Habitats** **Explore and research the allotment as a habitat**– plant allotment and create good growing conditions **Create a bug hotel with different microhabitats** – predict which creatures each will attract gather data. Harvest, draw and eat food from the allotment.
Theme	TOMB RAIDERS		DISAPPEARING RAINFORESTS		WE'LL MEET AGAIN! (WW2)	
KS2 (Yr 3 & 4)	**States of matter: What's the matter?** **Separating solids and liquids -** investigative skills. **Dissolving and evaporation** - including every day examples **The Water cycle** Changing state through heating and cooling (measure and research temperature).	**Sound: Sounds spectacular** **Low & high sounds** **Natural and man-made** sounds **How sound travels –** investigative skills. **Measuring sounds** - the function of the ear: cochlea, ear canal, ear drum. **Voices** - voice boxes and echoes	**Living things and their habitats: A world of living things** **Vertebrates and invertebrates** **Types of plants -** sorting & categorising, investigative skills. **Comparing habitats** - local habitats compared with rainforest habitats. **Organisms** and their preferred places to live.	**Animals including humans; The circle of life** **Sequencing food chains** - predators, herbivores, omnivores and carnivores. **Digestion** - steps of digestion, use of different components e.g. teeth, enzymes etc **Comparing human and animal digestion** **Diets** - of humans and animals **Teeth** - Roles of different teeth. **Healthy teeth –** investigative skills.	**Electricity: Electric personalities** **Uses at home -** electrical appliances, safety. **Circuits & components** **Conductors and insulators** **How does electricity travel?** – Investigative skills.	**Plants: Feast of flowers, fruits and seeds** **Lifecycle of flowering plants** - **Parts of a flower** Pollination Seed formation and dispersal Fruit

What do they go on to learn about in Year 5 and 6?

Year 5

Properties and changes to 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; **Space** - describe the movement of the Earth, and other planets, relative to the Sun in the solar system; **Circuits -** associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit; **Sound** - identify how sounds are made, associating some of them with something vibrating; **Living things and their habitats, with human growth -** describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

Year 6

Materials & Change- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution; **Forces** - identify the effects of air resistance, water resistance and friction, that act between moving surfaces; **Inheritance & evolution -** recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago; **Light** - 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; **Human body** - identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood; **Animal Classification -** describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals

How does it all link with the National Curriculum?

Working scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

> asking simple questions and recognising that they can be answered in different ways **>** observing closely, using simple equipment **>** performing simple tests identifying and classifying **>** using their observations and ideas to suggest answers to questions

> gathering and recording data to help in answering questions.

Key Stage 1: Subject content

Plants:

Year 1: **>** 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.

Year 2: **>** 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.

Animals including humans

Year 1 **>** 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.

Year 2 **>** 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 amounts of different types of food, and hygiene.

Everyday materials

Year 1 **>** 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.

Year 2 **>**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.

Seasonal changes

Year 1 **>**observe changes across the four seasons **>**observe and describe weather associated with the seasons and how day length varies.

Living things and their habitats

Year 2- **>**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 different sources of food.

Key Stage 2: Subject content

Working scientifically: During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

> asking relevant questions and using different types of scientific enquiries to answer them **>**setting up simple practical enquiries, comparative and fair tests **>** making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers **>** gathering, recording, classifying and presenting data in a variety of ways to help in answering questions **>** recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **>** reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions **>** using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions **>** identifying differences, similarities or changes related to simple scientific ideas and processes **>** using straightforward scientific evidence to answer questions or to support their findings.

Plants

Year 3 **>** 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.

Animals including humans

Year 3 **>** identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat **>** identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Year 4 **>** 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 and prey.

Rocks

Year 3 **>**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.

Light

Year 3 **>** 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 & that there are ways to protect their eyes **>** 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.

Forces and magnets

Year 3 **>**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.

Living things and their habitats

Year 4 **>** recognise that living things can be grouped in a variety of ways **>** explore & use classi- fication keys to help group, identify & name a variety of living things in their local &wider environment **>** recognise that environments can change & that this can sometimes pose dangers to living things.

States of matter

Year 4 **>** compare & group materials together, according to whether they are solids, liquids or gases **>** observe that some materials change state when they are heated or cooled, & measure or research the temperature at which this happens in degrees Celsius (°C) **>** identify the part played by evaporation & condensation in the water cycle & associate the rate of evaporation with temperature.

Sound

Year 4 **>**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 a sound and the strength of the vibrations that produced it **>**recognise that sounds get fainter as the distance from the sound source increases.

Electricity

Year 4 **>** 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.