



St. Ignatius Catholic Primary School



Science Long Term Plan

| <u>Key Stage One</u> Two-Year Rolling Programme | |
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| Year A | 2020 – 2021 |
| Year B | 2021 – 2022 |

| <u>Key Stage Two</u> Three-Year Rolling Programme | |
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| Year A | 2020 – 2021 |
| Year B | 2021 – 2022 |
| Year C | 2022 - 2023 |

Science Rationale

It is our intention at St. Ignatius Catholic Primary School to develop in all children a lifelong curiosity and interest in science. We intend for children to have the best possible opportunities to learn through systematic investigations of the physical, chemical and biological aspects of the world which rely on first-hand experiences.

Through the new National curriculum 2014, children's entitlement to participate fully in science is realised and this must be adopted as a consistent approach throughout school. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions and concepts.

Through science, the pupils at St. Ignatius Catholic Primary School will continue to deepen their respect, care and appreciation for the natural world and all its phenomena.

We aim to deliver a consistent approach in the teaching of science to ensure that all children are equipped with secure knowledge and skills for the future and this is visible in the long term plan outline below alongside the Science Policy.

'Year A' Overview

| | <u>Autumn 1</u> | <u>Autumn 2</u> | <u>Spring 1</u> | <u>Spring 2</u> | <u>Summer 1</u> | <u>Summer 2</u> |
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| <u>Nursery</u> (Themes) | UTW: Dinosaurs & Fairies | UTW: Superheroes | UTW: Handa's Surprise | UTW: Animals | UTW: Jack & the Beanstalk | UTW: The Sea |
| <u>Class 1</u> EYFS | UTW: Roar! Was that a Dinosaur? | | UTW: Tell me a Tale | | UTW: The Seaside | |
| <u>Class 2</u> Y1&2 | Humans & Senses (Y1) | Seasonal Change (Y1) | Materials (Y1) | Plants (Y1) | Seasonal Change (Y1) | Animals (Y1) |
| <u>Class 3</u> Y3&4 | Health & Nutrition (Y3) | Rocks & Fossils (Y3) | Functions & Parts of Plants (Y3) | Forces & Magnets (Y3) | Skeleton & Movement (Y3) | Light & Astronomy (Y3) |
| <u>Class 4</u> Y4&5 | Forces (Y5) (Friction, Resistance & Gravity) (Pulleys, Levers, Gears & Simple Machines) | | Earth & Space (Y5) | Properties & Changes of Materials (Y5) | | Living Things & Habitats & Human Life Cycles (Y5) |
| <u>Class 5</u> Y6 | Living Things & Habitats (Classifying Plants & Animals) | Evolution & Inheritance | Light & Astronomy | Electricity | Keeping Healthy (Diet, Exercise, Lifestyle & Circulatory System) | |

'Year B' Overview

| | <u>Autumn 1</u> | <u>Autumn 2</u> | <u>Spring 1</u> | <u>Spring 2</u> | <u>Summer 1</u> | <u>Summer 2</u> |
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| <u>Nursery</u> (Themes) | UTW: Dinosaurs & Fairies | UTW: Superheroes | UTW: The Gruffalo | UTW: Minibeasts | UTW: Fairy Tales | UTW: Bears |
| <u>Class 1</u> EYFS | UTW: Roar! Was that a Dinosaur? | | UTW: Tell me a Tale | | UTW: The Seaside | |
| <u>Class 2</u> Y1&2 | Animals including Humans (How We Grow & Stay Healthy) (Y2) | | Everyday Materials (Y2) | Growing Plants (Y2) | Living Things & Habitats (Including Life Cycles) (Y2) | |
| <u>Class 3</u> Y3&4 | States of Matter & Water Cycle (Y4) | Sound (Y4) | Electricity (Y4) | Teeth & Digestion (Y4) | Living Things & Habitats (Environment) (Y4) | |
| <u>Class 4</u> Y4&5 | States of Matter & Water Cycle (Y4) | Sound (Y4) | Electricity (Y4) | Teeth & Digestion (Y4) | Living Things & Habitats (Environment) (Y4) | |
| <u>Class 5</u> Y6 | Living Things & Habitats (Classifying Plants & Animals) | Evolution & Inheritance | Light & Astronomy | Electricity | Keeping Healthy (Diet, Exercise, Lifestyle & Circulatory System) | |

'Year C' Overview

Key Stage Two Only

| | <u>Autumn 1</u> | <u>Autumn 2</u> | <u>Spring 1</u> | <u>Spring 2</u> | <u>Summer 1</u> | <u>Summer 2</u> |
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| <u>Class 3</u> Y3&4 | Health & Nutrition (Y3) | Rocks & Fossils (Y3) | Functions & Parts of Plants (Y3) | Forces & Magnets (Y3) | Skeleton & Movement (Y3) | Light & Astronomy (Y3) |
| <u>Class 4</u> Y4&5 | Forces (Y5) (Friction, Resistance & Gravity) (Pulleys, Levers, Gears & Simple Machines) | | Earth & Space (Y5) | Properties & Changes of Materials (Y5) | | Living Things & Habitats & Human Life Cycles (Y5) |
| <u>Class 5</u> Y6 | Living Things & Habitats (Classifying Plants & Animals) | Evolution & Inheritance | Light & Astronomy | Electricity | Keeping Healthy (Diet, Exercise, Lifestyle & Circulatory System) | |



'Year A' Science Coverage



Curriculum Objectives & Unit Narratives

| <u>Nursery</u> | <u>Autumn 1 Dinosaurs & Fairies</u> | <u>Autumn 2 Superheroes</u> | <u>Spring 1 The Gruffalo</u> | <u>Spring 2 Minibeasts</u> | <u>Summer 1 Fairy Tales</u> | <u>Summer 2 Bears</u> |
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| <u>Unit Narrative</u> | The children will be learning about Dinosaurs and Fairies, listen to and join in with stories and poems such as Harry & the Bucketful of Dinosaurs, Tyrannosaurus Drip, Tom and the Dinosaurs and Dinosaur Roar. They will learn to extend their vocabulary by naming different types of dinosaur, find out how we know so much about these extinct creatures, create a variety of items for our visiting fairies and wizards and use their imagination to ask and answer questions about fairies and wizards. | The children will be learning to listen to and retell stories linked to our topic of Superheroes such as 'Superkid', 'Supertato', 'Super Daisy' and 'George Saves the World by Lunchtime'. We will work together to make up and act out imaginative stories based on superheroes and children will use their imagination to create their own superhero with a costume, gadget and super power. | The children will be learning to listen to and join in with stories in small groups, talk about the main characters, events and setting in a story, make puppets using a range of materials. They will retell a familiar story using props they have made (The Gruffalo and The Gruffalo's Child), build a home for the Gruffalo, talk about animal homes and nocturnal animals, talk about animals they have seen and comment and ask questions about different animals. | The children will be learning to comment and ask questions about aspects of their familiar world, such as the place where they live or the natural world. They will talk about some of the things they have observed such as plants, animals, natural and found objects, talk about why things happen and how things work. They will develop an understanding of growth, decay and changes over time and show care and concern for living things and the environment. We will order some caterpillars so that the children can see their growth and development into butterflies. | The children will be learning to listen to and join in with stories in small groups, talk about the main characters, events and setting in a story, act out a narrative in small groups and use available resources to create props to support role play. We will focus on the stories of The Gingerbread Man, The Three Billy Goats Gruff and The Three Little Pigs and investigating aspects of their familiar world such as the place where they live or the natural world. We will also talk about some of the things they have observed | We will be reading stories such as 'Goldilocks & the Three Bears', 'We're Going on a Bear Hunt' by Michael Rosen and 'This is the Bear' by Sarah Hayes. We would like to hold a Teddy Bears Picnic on the last day of term with parents. This term the children will be learning to play alongside other children who are engaged in the same theme, play cooperatively as part of a group to act out a narrative. They will also join in with repeated refrains and anticipate key events and phrases in rhymes and stories. |
| <u>Development Matters Statements</u> 30 – 50 months | Physical Development 'Health and Self-Care' | <ul style="list-style-type: none"> • To observe the effects of physical activity on their bodies. | | | | |
| | Understanding the World 'The World' | <ul style="list-style-type: none"> • To comment and ask questions about aspects of their familiar world, such as the place where they live or the natural world. • To talk about some of the things they have observed, such as plants, animals, natural and found objects. • To talk about why things happen and how things work. • To develop an understanding of growth, decay and changes over time. • To show care and concern for living things and the environment. | | | | |
| | Expressive Arts and Design 'Exploring and Using Media and Materials' | <ul style="list-style-type: none"> • To begin to be interested in and describe the texture of things. | | | | |

| <u>Class 1</u> EYFS | <u>Autumn 1 & Autumn 2</u> <u>Roar! Was that a Dinosaur?</u> | | <u>Spring 1 & Spring 2</u> <u>Tell me a Tale</u> | <u>Summer 1 & Summer 2</u> <u>The Seaside</u> |
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| <u>Unit Narrative</u> | The children will be learning about Dinosaurs. They will listen to and join in with stories and poems such as Hetty Peck and The Somethingosaur. They will learn to extend their vocabulary by naming different types of dinosaur and find out how we know so much about these extinct creatures. They will explore different ways to move like a dinosaur and explore different diets of dinosaurs. They will have a go at creating a 'healthy snack' for a dinosaur. The children will gain knowledge about changing materials by trying to release frozen dinosaurs from ice. | | The children will explore a range of different stories including Jack and the Beanstalk, Little Red Riding Hood and The Gingerbread Man. The children will travel in different ways, such as running like the gingerbread man. The children will also attempt to create and tackle a 'beanstalk obstacle course'. As part of the topic the children will plant a bean to observe what happens as a plant grows. They will also explore different materials and use them for different purposes, for example making a boat for the gingerbread man to cross the river. | The children will enjoy listening to stories such as The Lighthouse Keeper's Lunch and Sharing a Shell. The children will think about healthy eating and the importance of exercise. During this topic the children will plant sunflower seeds to observe their growth and discuss the differences between bean plants and sunflowers. The children will look at the life cycle of different sea creatures and seagulls. |
| <u>Development Matters Statements</u> 40 – 60 months | Physical Development 'Health and Self-Care' | <ul style="list-style-type: none"> • To eat a healthy range of foodstuffs and understand a need for variety in food. • To show some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health. | | |
| | Understanding the World 'The World' | <ul style="list-style-type: none"> • To look closely at similarities, differences, patterns and change. | | |
| <u>Early Learning Goals</u> | Understanding the World 'The World' | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes. | | |
| | Physical Development 'Health and Self-Care' | To know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe. | | |

| <u>Class 2</u> Y1&2 | <u>Autumn 1</u> Humans & Senses | <u>Autumn 2</u> Seasonal Change <i>'Autumn Party' – See Lancashire Planning</i> | <u>Spring 1</u> Materials | <u>Spring 2</u> Plants | <u>Summer 1</u> Seasonal Change <i>'Summer Picnic' – See Lancashire Planning</i> | <u>Summer 2</u> Animals <i>Visitor to school?</i> |
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| <u>Unit Narrative</u> | In this unit of work, children will build a foundation of understanding the human body, being able to identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. They will make comparisons between humans and animals and consider how and why we use our senses and how this may be similar or different to animals. They will use their senses to compare different textures, sounds and smells. | In this unit of work, which will be revisited again later in the year but in a different context, children will observe changes across autumn and winter. They will observe and describe weather associated with these seasons and consider how we prepare for the seasons in the way we dress, keep records of how plants have changed over time and make tables and charts about the weather. <i>Focus: wind, rain, puddles, cold, ice, snow (Lancashire).</i> | Children will have the opportunity to distinguish between an object and the material from which it is made. They will be able to 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 and compare and group together a variety of everyday materials on the basis of their simple physical properties. They will also explore simple questions about the suitability of materials for particular jobs. E.g. Waterproof materials for umbrellas. | In this unit, children will identify and name a variety of common wild and garden plants, identify and describe the basic structure of a variety of common flowering plants, including trees and use the local environment throughout the year to explore and answer questions about plants growing in their habitat through careful observations of flowers and vegetables which they have planted. They will also observe, compare and contrast familiar plants, describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. | Building on previous work this year, children will now look into spring and summer months in greater depths and the changes which happen in the environment. This could be weather, plant and animal based. <i>Focus: sunshine, shadows, clouds (Lancashire).</i> | In the animals unit of work, children will identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals, they will learn more about animals which are carnivores, herbivores and omnivores and describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Children will use the local environment throughout the year to explore and answer questions about animals in their habitat and understand how to take care of animals taken from their local environment and the need to return them safely after study. Children will use their observations to compare and contrast animals at first hand or through videos and photographs, describe how they identify and group them. |
| <u>Sticky Knowledge</u> | <ul style="list-style-type: none"> - Humans have five senses; taste, touch, smell, see, hear. - We use our senses for lots of different reasons. - Know what different parts of the body are called | <ul style="list-style-type: none"> - Weather can change - There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc - Days are longer and hotter in the summer - Days are shorter and colder in the winter - There are four seasons: Spring, Summer, Autumn, Winter | <ul style="list-style-type: none"> - There are many different materials that have different describable and measurable properties. - Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass). - The properties of a material determine whether they are suitable for a purpose. | <ul style="list-style-type: none"> - Plants grow from seeds/bulbs - Plants need light and water to grow and survive - Plants are important - We can eat lots of plants | <ul style="list-style-type: none"> - Weather can change - There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc - Days are longer and hotter in the summer - Days are shorter and colder in the winter - There are four seasons: Spring, Summer, Autumn, Winter | <ul style="list-style-type: none"> - There are many different animals with different characteristics. - Animals have senses to help individuals survive. When animals sense things they are able to respond. - Animals need food to survive. - Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy. |
| <u>Key Questions</u> | <p><i>What is my body made up of?</i> <i>Are all humans the same?</i> <i>Are humans animals?</i> <i>Are we the same as other animals?</i> <i>How does my body find out about its surroundings?</i> <i>How good is our sense of taste?</i> <i>How good is our sense of smell?</i></p> | <p><i>What is the weather like today?</i> <i>What clothes will I need for this weather?</i> <i>How do I feel in this weather?</i> <i>Which season is it? How do I know?</i></p> | <p><i>Can you describe it?</i> <i>What does it feel like?</i> <i>What does it look like?</i> <i>What can it do?</i> <i>What is it made from?</i> <i>What is the best material for...?</i></p> | <p><i>How do plants change?</i> <i>Is it a plant? How do we know?</i> <i>Can we name the different parts of a plant?</i> <i>Are all plants the same?</i> <i>Is a tree a plant?</i> <i>How many different plants can we find/name?</i></p> | <p><i>What is the weather like today?</i> <i>What clothes will I need for this weather?</i> <i>How do I feel in this weather?</i> <i>Which season is it?</i> <i>How do I know?</i></p> | <p><i>How do we know they are animals?</i> <i>What makes an animal an animal?</i> <i>What features do animals have? (head, body/body parts, body covering, way of moving, senses, number of legs, wings, etc.)</i></p> |

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| | | <p><i>Is it the same as yesterday / last week / last month? What will it be like tomorrow / next week / in the summer, etc? How can we measure the weather?</i></p> | | <p><i>Are all leaves the same? Can you draw a leaf? Are leaves always green? Which parts of a plant can we eat? Is it a fruit or a vegetable? Are all roots the same? How many colours can you find in nature?</i></p> | <p><i>Is it the same as yesterday / last week / last month? What will it be like tomorrow / next week / in the summer, etc? How can we measure the weather?</i></p> | <p><i>What things are similar between two different animals? All animals are the same. True or false? Prove it. How can we help to look after animals? How do animals move? What if animals couldn't move around? Can you invent an animal? What is its head and body like? How does it move? What is it covered with? Does it have a tail? Which 'super sense' does it have?</i></p> |
| <p><u>National Curriculum Objectives</u></p> | <p>- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> | <p>- Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies.</p> | <p>- 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.</p> | <p>- 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.</p> | <p>- Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies.</p> | <p>- 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).</p> |
| <p><u>Working Scientifically</u></p> | <p><u>KS1</u></p> <ul style="list-style-type: none"> • 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. | | | | | |

| Class 3 Y3&4 | <u>Autumn 1</u> Health & Nutrition | <u>Autumn 2</u> Rocks & Fossils | <u>Spring 1</u> Functions & Parts of Plants | <u>Spring 2</u> Forces & Magnets | <u>Summer 1</u> Skeleton & Movement | <u>Summer 2</u> Light & Astronomy |
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| <u>Unit Narrative</u> | <p>In this unit children will be building on their KS1 knowledge of the importance of exercise and different types of foods (Y2). They will have the opportunity to look in more detail at the significance of nutrition and where these are found in different food groups. They will make comparisons of diet requirements with other animals and decide ways of grouping them. By the end of the unit they will have posed their own questions and completed research to answer these.</p> | <p>Children will build on prior understanding of materials by learning about the properties of different types of rocks and soils. They will observe and classify rocks using microscopes and consider their uses. Children will make links with our Volcanoes topic to consider how rocks and fossils are formed. Children will investigate different soils, raising and answering questions into how these are formed and how they are used.</p> | <p>This unit of work builds on prior Y2 knowledge of what plants need to grow by exploring these requirements and how they vary from plant to plant. They will investigate the effect of different factors on plant growth such as lack of light. Children will observe the different stages of plant life cycles over a period of time and have hands on experience planting seeds. They will generate questions about seed dispersal and create fair tests to observe water transport in plants.</p> | <p>Children are introduced to magnets and forces and will look at comparing and grouping objects based on how they move on different surfaces. They will gather and record data on their own investigations testing the strength of different magnets. They will make links to Materials knowledge and compare and sort materials based on magnetism. By the end of the unit, children will have considered the properties of magnets and how they are useful in everyday life, suggesting their own creative ideas for uses.</p> | <p>Children will develop their knowledge of the human body parts (Y1) to consider the importance of the skeleton. They will have the opportunity to create their own models of moving muscles to understand their function. Links to PE will be made to investigate their own muscles through comparing and observing exercise. The key scientist Diane France will also be researched to learn how bones were used to solve crimes.</p> | <p>In this unit of work children will be introduced to the topic of light and its many sources. They will work scientifically to seek patterns between shadows, objects and light sources and how distance can affect these. Children will make connections with The Stone Age topic by looking at how the sun and shadows were used significantly. By the end of the unit, children will be able to explain what light is and begin to understand how it behaves, such as reflection on surfaces.</p> |
| <u>Sticky Knowledge</u> | <ul style="list-style-type: none"> - Humans need a variety of food from different food groups to remain healthy - Different animals are adapted to eat different foods. | <ul style="list-style-type: none"> - There are different types of rock. - There are different types of soil. - Soils change over time. - Different plants grow in different soils. - Fossils tell us what has happened before. - Fossils provide evidence. - Palaeontologist's use Fossils to find out about the past. - Fossils provide evidence that living things have changed over time. | <ul style="list-style-type: none"> - Plants are producers, they make their own food. - Their leaves absorb sunlight and carbon dioxide - Plants have roots, which provide support and draw water from the soil - Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production - Seed dispersal improves a plants chances of successful reproduction - Seeds/bulbs require the right conditions to germinate and grow. - Seeds contain enough food for the plant's initial growth- The properties of a material determine whether they are suitable for a purpose. | <ul style="list-style-type: none"> - Magnets exert attractive and repulsive forces on each other. - Magnets exert non-contact forces, which work through some materials. - Magnets exert attractive forces on some materials. - Magnet forces are affected by magnet strength, object mass, distance from object and object material. | <ul style="list-style-type: none"> - Many animals have skeletons to support their bodies and protect vital organs. - Muscles are connected to bones and move them when they contract. - Movable joints connect bones. | <ul style="list-style-type: none"> - There must be light for us to see. Without light it is dark. - We need light to see things even shiny things. - Transparent materials let light through them and opaque materials don't let light through. - Beams of light bounce off some materials (reflection). - Shiny materials reflect light beams better than non-shiny materials. - Light comes from a source |

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| <p><u>Key Questions</u></p> | <p><i>How do we keep healthy? Why is it important to keep healthy? What choices can we make for a healthy lifestyle? How can we group the type of foods we eat? How do the different food groups help to keep us healthy? What are the diets of different animal like? Can you design a healthy meal/menu?</i></p> | <p><i>What is rock? How can rocks be different? What are rocks used for? How can we test rocks/compare rocks? How hard is your rock? Does it float? Does it allow water in? Is it permeable? What happens if you put an acid on your rock? What if all rocks were the same? How do rocks change over time? What are fossils? How are fossils formed? What can fossils tell us about the past? What is soil made up of? How is soil formed?</i></p> | <p><i>What makes a plant a plant? (Features of plants) What does each feature do to help the plant survive, grow and reproduce? What do plants need to grow healthily? Do seeds need soil to grow? Do plants need soil to grow healthily? How much water should we give plants? How long can they last without? Where is the best location to keep our plants? Does a greenhouse help? Why do plants need leaves? What happens if we remove all the leaves from a plant? Why are plants important? What if all plants died out? How do plants produce new plants? How do plants help their seeds to spread? What are pollinators and how do they help plants? How do plants change as they grow?</i></p> | <p><i>What materials are attracted to magnets? When/where are magnets useful? How strong are magnets? Are all magnets the same strength? Will a magnet attract plastic covered paperclips? What if everything was magnetic? How can we make it move? How can we stop things? How can we change the movement? How can we slow down a moving object? Do different surfaces make a difference? What if we could only push but not pull?</i></p> | <p><i>What if humans didn't have a skeleton? Do all animals have a skeleton? Which are the most important bones in our body and why? Does our skeleton grow the older we get? How do we know? How does our skeleton help with movement? Why do we have muscles and how do they work? Do we all grow at the same rate? Is our body in proportion?</i></p> | <p><i>What are shadows? How are shadows formed? Can shadows change? Where will the shadow be? What will the shadow be like? How does light travel? How do mirrors work? / What can mirrors do? Can we use mirrors to move light? / Can I reflect light using mirrors? Can you get complete darkness?</i></p> |
| <p><u>National Curriculum Objectives</u></p> | <p>- 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</p> | <p>- 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.</p> | <p>- 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.</p> | <p>- 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.</p> | <p>- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> | <p>- 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 the light from a light source is blocked by an opaque object. - Find patterns in the way that the size of shadows change.</p> |

Working Scientifically

LKS2

- 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.

| Class 4 Y4&5 | <u>Autumn 1 & Autumn 2</u> Forces (Friction, Resistance & Gravity) (Pulleys, Levers, Gears & Simple Machines) | <u>Spring 1</u> Earth & Space | <u>Spring 2 & Summer 1</u> Properties & Changes of Materials (Reversible and Irreversible Changes) (Material Properties) | <u>Summer 2</u> Living Things & Habitats & Human Life Cycles |
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| <u>Unit Narrative</u> | <p>Children will build on their understanding from year 3 about how things move on different surfaces; that some forces need contact between two objects, but magnetic forces can act at a distance and the way magnets attract or repel each other and attract some materials and not others. Throughout the unit they will develop their working scientifically skills through investigations such as exploring falling paper cones, designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They will explore resistance in water by making and testing boats of different shapes. They will also design and make products that use levers, pulleys, gears and/or springs and explore their effects. As they move in to KS2 they will beginning to focus more on exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.</p> | <p>This unit will be covered during the winter so that children can observe the different moon phases during early evening as homework tasks (cloud cover permitting)! They will continue to develop their working scientifically skill during this unit by comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day and finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. They will also have the chance to research a range of key scientists.</p> | <p>By the end of this unit, children should be able to categorize material changes into reversible or irreversible. Reversible changes: freezing, melting, boiling, evaporating, condensing and dissolving. Irreversible changes: cooking, reactions caused when some materials are mixed and new materials are created plus burning, rusting. They will build on their knowledge and experience from year four when they learned to 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 this happens in degrees Celsius (°C), identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. During the unit they will carry out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.</p> | <p>During this unit the children will build on their knowledge from year 4 that living things can be grouped in a variety of ways, using classification keys to help group, identifying and naming a variety of living things in their local and wider environment and recognising that environments can change and that this can sometimes pose dangers to living things. They will learn to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird and the life process of reproduction in some plants and animals. They will further develop their working scientifically skills by observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.</p> |
| <u>Sticky Knowledge</u> | <ul style="list-style-type: none"> - Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. - Friction is a force against motion caused by two surfaces rubbing against each other. - Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move | <ul style="list-style-type: none"> - Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. - Objects with larger masses exert bigger gravitational forces. - Objects like planets, moons and stars spin. - Smaller mass objects like planets orbit large mass objects like stars. - Stars produce vast amounts of heat and light. - All other objects are lumps of rock, metal or ice and can be seen | <ul style="list-style-type: none"> - When two or more substances are mixed and remain present the mixture can be separated. - Some changes can be reversed and some can't. - Materials change state by heating and cooling. - All matter (including gas) has mass. - Sometimes mixed substances react to make a new substance. These changes are usually irreversible. - Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. - Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature) - If it is not possible to get the material back easily it is likely that it is not there anymore and | <ul style="list-style-type: none"> - Different animals mature at different rates and live to different ages. - Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction - Hormones control these changes; which can be physical and/or emotional. - Some organisms reproduce sexually where offspring inherit information from both parents. - Some organisms reproduce asexually by making a copy of a single parent. - Environmental change can affect how well an organism is suited to its environment. |

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| | | because they reflect the light of stars. | something new has been made (irreversible change) | - Different types of organisms have different lifecycles. |
| <u>Key Questions</u> | <p>What is friction? When is friction useful? When is friction a disadvantage? What if there was no friction? How can objects be moved more easily? i.e. reduce the friction (rollers, lubricants, shiny surfaces, wet surfaces) How can we slow down a moving object? How can you slow down the movement of an object through the air? Why does everything fall to the ground when thrown in the air? How can you measure a force? How can we make a small force have a big effect? How do forces affect the movement? What are levers and why are they useful? What are pulleys and why are they useful? How are gears useful? What is a simple machine? Can more than one force be acting? Which is the largest force in each situation? How does a pendulum work? How does the length of the string affect the movement?</p> | <p>What do we know about the Earth, Sun and Moon? How do the Earth, Sun and Moon fit within our solar system? How do we get day and night? What do we know about the shape and movement of the Earth? Why does the moon appear to change shape? How do shadows, created by the sun, change during a day? How were shadows used in the past to help people tell the time?</p> | <p>What happens if we mix different solids together? Can you get it back? What happens if we mix solids and liquids together? Does it dissolve? How can I separate them? (un-dissolved / insoluble solids from liquids?) Can you change it back again? Can I make it dissolve more quickly? Can we always get back what we started with? What happens when we mix different things? What happens when we burn things? What happens when we cook things? Why do some things rust? What materials do we use / need for...? Why? How can we sort materials? What are its properties? Why is it useful? Is this the best material for the job? Can light travel through things? How can we keep things warm? How can we keep things cold? What is the best insulation material? What happens to the temperature How are insulating materials used in everyday products?</p> | <p>How do our bodies change as we grow? How do we change as we move from children to teenagers to adulthood? What is a life cycle? How do plants and animals change over time? What are baby animals like? How are they different in different species? How do animal life cycles differ? Who are David Attenborough and/or Jane Goddall and what did they do / study? How do plants make new plants? What changes does a plant go through during its life cycle? What features does a plant have to aid reproduction? Can you identify plant features and describe them? Are all plants the same? Do they all reproduce in the same way? What is the job of the different reproductive parts of a plant? Is a tomato really a fruit of a vegetable? Do all plants reproduce by seed? What if plants only produced one seed? How do you take a cutting to successfully grow a new plant? What if all plants died out?</p> |
| <u>National Curriculum Objectives</u> | <ul style="list-style-type: none"> - Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. - Identify the effects of air resistance, water resistance and friction that act between moving surfaces. - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | <ul style="list-style-type: none"> - Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. - Describe the movement of the Moon relative to the Earth. - Describe the Sun, Earth and Moon as approximately spherical bodies. - Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. | <ul style="list-style-type: none"> - 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 changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. | <ul style="list-style-type: none"> - 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 the changes as humans develop to old age. |

Working Scientifically Objectives

LKS2

- 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.

UKS2

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Using test results to make predictions to set up further comparative and fair tests.
- Reporting and presenting 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.
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

| Class 5 Y6 | <u>Autumn 1</u> Living Things & Habitats (Classifying Plants & Animals) | <u>Autumn 2</u> Evolution & Inheritance | <u>Spring 1</u> Light & Astronomy | <u>Spring 2</u> Electricity | <u>Summer 1 & Summer 2</u> Keeping Healthy (Diet, Exercise, Lifestyle & Circulatory System) |
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| Unit Narrative | <p>In this unit of work, children will build on their prior knowledge of grouping living things (Y4) by looking at the classification system in more detail. They will have the opportunity to understand why we classify plants and animals according to a variety of characteristics and by the end of the unit, will be able to give reasons for their classifications following an assortment of enquiries and scientific working, including direct observations, comparing, sorting, grouping and identifying common observable characteristics of plants and animals and their similarities and differences. They will also find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.</p> | <p>Children will build on previous learning about rocks and fossils (Y3) to find out more about how living things on earth have changed over time. They will be introduced to the idea that characteristics are passed from parents to their offspring and also about variation and adaptation, and how this can make animals more or less able to survive in particular environments. For example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox and what the advantages and disadvantages of these are. They will also have the opportunity to find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.</p> | <p>In this unit of work, children will build on previous learning to explore the way that light behaves (Y3), including light sources, reflection and shadows. They will undertake a variety of first hand experiences to explore and observe light, talking about what happens and making predictions. Children will also have the opportunity to explore inventions and discoveries about light, looking at photography and links with Victorian Britain and also looking at light tricks, such as the ones found at theme parks and fair grounds where light and mirrors are used to trick visitors or creative beautiful displays.</p> | <p>Children will build on learning of how to construct simple series circuits (Y4), to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They will learn how to represent a simple circuit in a diagram using recognised symbols. Children will take part in a variety of challenges to create different circuits for different purposes, and to systematically identifying through investigation the effect of changing one component at a time in a circuit and the impact on the output of that circuit.</p> | <p>Children will build on learning about the main body parts and internal organs (Y3, Y4) (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. They will learn how to keep their bodies healthy and how their bodies might be damaged. Children will explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health, including how some drugs and other substances can be harmful to the human body.</p> |
| Sticky Knowledge | <ul style="list-style-type: none"> - Variation exists within a population (and between offspring of some plants) – NB: this Key Idea is duplicated in Year 6 Evolution and Inheritance. - Organisms best suited to their environment are more likely to survive long enough to reproduce. - Organisms are best adapted to reproduce are more likely to do so. - Organisms reproduce and offspring have similar characteristic patterns. - Competition exists for resources and mates. | <ul style="list-style-type: none"> - Life cycles have evolved to help organisms survive to adulthood. - Over time the characteristics that are most suited to the environment become increasingly common. | <ul style="list-style-type: none"> - Animals see light sources when light travels from the source into their eyes. - Animals see objects when light is reflected off that object and enters their eyes. - Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam. - Light travels in straight lines. | <ul style="list-style-type: none"> - Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.' - The greater the current flowing through a device the harder it works. - Current is how much electricity is flowing round a circuit. - When current flows through wires heat is released. The greater the current, the more heat is released. | <ul style="list-style-type: none"> - The heart pumps blood around the body. - Oxygen is breathed into the lungs where it is absorbed by the blood. -Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.) |

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| <p><u>Key Questions</u></p> | <p>How many different animals/plants are there? How do scientists group these effectively? Are all plants and animals the same? How can we use the differences between animals to help us identify them? What if all the insects/mammals/microbes/birds died out? Who is Carl Linnaeus and what did he discover/create?</p> | <p>How do animals survive in different environments? Why do animals need to reproduce? How have species changed over time? Who are Mary Anning, Charles Darwin and Alfred Wallace? Why are some species under threat while others aren't? What happens if we remove a species from the food chain? What affect does pollution and global climate change have on animals/plants/food chains?</p> | <p>How does light travel? How do we see? How does light get into our eyes? How can we use mirrors to see behind us? How do shadows created by the sun change during a day? How can we represent light travelling in drawings? Can you make simple drawings to help to explain how light travels? How does light behave?</p> | <p>Which circuits work? How can we draw different circuits more accurately? Why do circuits need a battery and wires? How can we identify faults in a circuit? How can we change circuits to create different effects? Can we solve circuit challenges? Where does electricity come from? How does electricity get to our homes?</p> | <p>What is our pulse rate? What is it we can feel? How do our hearts and lungs work together to keep us alive? Why does our heart beat faster and our breathing increase when we exercise? Do different types of exercise affect our hearts in different ways? Which types of exercise are better for our hearts? What if our blood always circulated at the same speed? What is a balanced diet? What if we only ate one type of food? Why should we eat different types of food? Which foods help our digestive system? Why do different people sometimes have different diets? (Sports people before an event, explorers, vegetarians, etc.)</p> |
| <p><u>National Curriculum Objectives</u></p> | <p>- 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. - Give reasons for classifying plants and animals based on specific characteristics.</p> | <p>- 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.</p> | <p>- 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.</p> | <p>- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. - Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. - Use recognised symbols when representing a simple circuit in a diagram.</p> | <p>- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. - Describe the ways in which nutrients and water are transported within animals, including humans - Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> |
| <p><u>Working Scientifically Objectives</u></p> | <p><u>UKS2</u></p> <ul style="list-style-type: none"> • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Using test results to make predictions to set up further comparative and fair tests. • Reporting and presenting 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. • Identifying scientific evidence that has been used to support or refute ideas or arguments. | | | | |