



St Marys Catholic Primary School
Living and Learning Together – Shining in our Faith
Science Essential Knowledge KS2

Rationale behind KS2 Mixed Age planning (following a 2 year rolling program)

The following has been adapted from the useful information from the primary-science website (links below) to support the rationale for sequencing units within a mixed-age curriculum map. The plans below may be adapted to suit the individual setting inline with the recommendations from the NC2014.

- Sequencing learning pgs 6-10 for mixed age classes - <https://www.primary-science.co.uk/product-page/sequencing-science-topics>
- 2-year mixed age rolling prog example curriculum map – particularly useful for KS1 <https://www.primary-science.co.uk/shop>

Plants

This is a Year 3 topic but children should have the opportunity to experience, observe and grow a variety of different plants throughout KS2. Ideally this will take place in the summer terms and will include exploring and observing asexual reproduction such as potato tubers and strawberry runners. There should also be opportunities to take cuttings so that children understand that plants can grow from other methods in addition to producing seeds.

Animals, including humans

The children will have time to access the topics in this strand all in cycle B. The Year 3 topic on Nutrition will be taught prior to doing the Y4 topics on teeth and digestion so that the skills can be built on and developed. In cycle A the lower KS2 children will concentrate on the Y3 topic including skeletons and movement and will link this to PSHE topics regarding exercise, health and looking after our bodies. The upper KS2 children will build on the lower KS2 skills and work on the Y5 and Y6 topics through Cycle B

Living things and their Habitats.

This will be taught in Cycle A in the summer term for lower KS2 and throughout the Autumn term in upper KS2 starting with the Y5 skills and developing these into the Y6 skills.

Properties of Materials

Pupils will encounter this topic in Cycle A and concentrate on the changes of materials, this will focus on separating materials, dissolving and reversible and irreversible changes all explored through practical investigations and observations. The second part of the topic will be covered in Cycle B and will cover the properties of materials including their uses in our environment.



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Cycle A	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y 3 / 4	Animals including Humans Nutrition (Y3) Teeth & Digestion (Y4)	Electricity (Y4) Circuits Uses of switches Conduction / insulation	States of Matter (Y4) Solids, liquids, gases Changes by heating / cooling	States of Matter (Y4) Water cycle – evaporation / condensation	Sound (Y3) How sounds are made? How sound moves? Changes in sounds	Living things and their Habitats (Y4) Groupings Classification keys Dangers to habitats
Y 5 / 6	Living things and their Habitats (Y5) Lifecycles / reproduction	Living things and their Habitats (Y6) Classification	Evolution / Inheritance / Adaptation (Y6) Information from fossils / change	Electricity (Y6) Circuits / symbols / changes and why they occur	Changes of materials (Y5) Filtering / sieving / evaporating	Changes of materials (Y5) Reversible and irreversible changes

Cycle B	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y 3 / 4	Animals including Humans Skeletons and Movement(Y3)	Rocks & Fossils (Y3) Different rock types How fossils are formed Types of soil	Forces and Magnets (Y3) Movement on different surfaces Magnetic materials Magnetic poles	Plants (Y3) Parts of plants & function Needs of plants Water transportation	Plants (Y3) Investigating parts need for pollination Pollination process Seed dispersal	Light (Y3) Reflections Dangers Shadow formation
Y 5 / 6	Animals including Humans (Y6) Circulatory system Diet / exercise / drugs Nutrient & water transport	Properties of Materials (Y5) Properties / solutions / separation	Forces (Y5) Gravity / friction / resistance / mechanisms	Animals including Humans (Y5) Changes in humans into old age	Light (Y6) How light travels / the eye / shadow formation	Earth and Space (Y5) Movements of the earth and moon



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CYCLE A	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y 3 /4	<p>Animals including Humans</p> <ul style="list-style-type: none"> *Understand that animals need nutrition as they grow and cannot make their own food. *Name the main foods needed for a nutritious diet. *Understand the EATWELL plate and how this guides us to having a healthy diet. *To name and describe simple functions of the basic parts of the human digestive system *To name and identify the different types of teeth in humans and their simple functions. *To construct and explain a variety of simple food chains. *To be able to explain the terms producer, predator and prey *To be able to identify the producer, predator, prey in a food chain 	<p>Electricity</p> <ul style="list-style-type: none"> *To identify common appliances that use electricity. *To be able to construct simple circuits and name each part of it. *Identify is circuits will work to light a bulb or not based on complete circuits. *Understand the purpose of a switch to complete a circuit and investigate materials that could act as a switch. *Understand conductors can work as a switch and this is usually metals. *Understand the opposite of a conductor is an insulator and how this will not conduct electricity. 	<p>States of matter</p> <ul style="list-style-type: none"> * To understand what is meant by solids, liquids and gases and be able to group materials according to this. *Observe and explain how materials change state when they are heated or cooled. *Measure the temperatures where changes happen with different materials. 	<p>States of matter</p> <ul style="list-style-type: none"> *Understand what is meant by evaporation and condensation and how this occurs in the water cycle. *Understand how rate of evaporation changes with temperature. *Investigate changes caused by heating / cooling / evaporation / condensation. 	<p>Sound</p> <ul style="list-style-type: none"> *Identify how some sounds are made and how vibrations carry the sounds. *Recognise and explain in words and pictures how vibrations from sounds travel through a medium such as the air to our ears. *Be able to name the parts of the ear that hear sound and explain how they work in simple terms. *Investigate patterns between the pitch of different sounds and the features of the object making the sound ie the material, size, etc. *Investigate the volume of a sound and the strength of the vibrations that produce it. *Recognise through investigation how sound 	<p>Living things and their habitats</p> <ul style="list-style-type: none"> *Recognise that living things can be grouped in different ways and label these groupings. *Explore using classification keys and how they are used to sort groups of living things. *Create own classification keys to sort and name living things. *Recognise some changes that occur in the environment and how these changes can impact on living things



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					gets fainter as distance from its source increases.	
	<p>Nutrition Nutrients Digestion Incisors canines molars Producer Predator Prey Carnivore Omnivore Herbivore</p>	<p>Appliance / electricity Circuit / cell / wire / lamp / bulb / switch Dangers / safety Conductor / insulator</p>	<p>Solid / liquid / gas Freeze / melt Evaporate / evaporation Condense / condensation Changing state Celsius / degrees thermometer</p>	<p>Solid / liquid / gas Freeze / melt Evaporate / evaporation Condense / condensation Changing state Celsius / degrees thermometer</p>	<p>Vibrate air Medium ear Volume pitch Faint loud string / percussion / woodwind / brass</p>	<p>Environment Plants / animals / vertebrates / invertebrates / fish / amphibians Dangers Impact Nature reserves Habitats Litter Pollution deforestation</p>
Y 5 / 6	<p>Living things and their habitats</p> <p>*Understand and explain the life process of reproduction in some plants.</p> <p>*Understand and explain the life process of reproduction in some animals</p> <p>*Understand and explain the life process of reproduction in some amphibians</p> <p>*Compare lifecycles and state similarities and differences and why these occur.</p>	<p>Living things and their Habitats</p> <p>*Be able to describe how living things are classified into broad groups depending on their characteristics.</p> <p>*Give reasons when classifying different groups and explain groupings to include micro organisms, plants and animals.</p> <p>*Explore how organisms are classified by scientists into more and more defined groupings.</p>	<p>Evolution & Inheritance</p> <p>*Be able to recognise that living things have changed over time and explain these changes.</p> <p>*Understand how fossils provide information about living things that lived on Earth millions of years ago.</p> <p>*Recognise that living things produce offspring that are the same but not identical to their parents and why this happens.</p> <p>*Identify different plants and animals that have adapted to their</p>	<p>Electricity</p> <p>*To recap how to make circuits using different components.</p> <p>*Use recognised symbols when recording circuits made.</p> <p>*To understand how the brightness of a lamp / volume of a buzzer relates to the number and voltage of cells used.</p> <p>*Compare and give reasons for variations in how components function in different circuits.</p>	<p>Changes of Materials</p> <p>*Use the knowledge of solids, liquids and gases to decide how mixtures can be separated.</p> <p>*Give the uses of different materials based on evidence from comparative and fair tests.</p> <p>*To know that dissolving, mixing and changes of state can be a reversible change.</p> <p>*Explain how formation of new materials occurs</p>	<p>Changes of Materials</p> <p>*Use the knowledge of solids, liquids and gases to decide how mixtures can be separated.</p> <p>*Give the uses of different materials based on evidence from comparative and fair tests.</p> <p>*To know that dissolving, mixing and changes of state can be a reversible change.</p> <p>*Explain how formation of new materials occurs</p>



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			environment and explain what and why this has happened. *Understand and explain that these adaptations lead to evolution over time.	*Be able to spot faults in circuits and be able to explain how to rectify these.	and that this is an irreversible change.	and that this is an irreversible change
	Classify / compare Phylum / class / order / family / genus / species Characteristic Vertebrate/ invertebrate Micro-organism	Classify / compare Phylum / class / order / family / genus / species Characteristic Vertebrate/ invertebrate Micro-organism	Evolution Adaptation Inheritance / inherited traits Adaptive traits Natural selection Variation Charles Darwin	Appliance Electricity Circuit Cell / wire / bulb / buzzer / switch Dangers safety Conductor Insulator	Solubility hardness Transparency Conduction Solution dissolve Separate evaporate Reversible irreversible chemical	Solubility hardness Transparency Conduction Solution dissolve Separate evaporate Reversible irreversible chemical
CYCLE B	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y 3 / 4	Animals including Humans *Describe the main parts of the skeleton and how it supports, protects and helps movement. *Be able to explain why the bones are needed in certain parts of our bodies. *Understand what muscles are and how they help support movements. *Understand how muscles work in pairs to aid movements.	Rocks and Fossils *To compare and group different rocks based on their appearance and simple properties. *Understand how different rocks are formed. *To understand that soil is made up of rocks and organic matter. *To be able to describe in simple terms how fossils are formed from living things a long time ago.	Forces & Magnets * To compare and record how different things move on different surfaces. *To understand that some forces need contact but magnetic forces can work from a distance. *Observe how magnets attract or repel each other and that magnets have two poles.	Plants *To describe and identify the functions of different parts of flowering plants. *To explore the requirements of plants for growth – air, light, water, nutrients and room to grow. *To investigate the ways that water is transported in plants. *To understand the parts of a plant needed to transport water and why this is necessary.	Plants *To explore the main stages in a lifecycle of flowering plants. *To understand what is meant by pollination and seed formation. And record this in different ways *To label the parts used in pollination and what they do. To understand different ways that seeds are	Light *To recognise that we need light to be able to see things and the absence of light is dark. *To test how light is reflected from different surfaces and explain what causes this. *To recognise that light from the sun can be dangerous and there are ways to protect our eyes.



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	*What clothes do we need in Autumn?	*Understand the significance of fossil hunting / Mary Anning and how we can learn about how and what animals lived years ago.	To know which poles of the magnet attract or repel. Compare and group everyday materials that are attracted by magnets and those that are not.		dispersed and how these occur.	*To investigate how to form shadows by blocking light using a solid object. *To investigate and explain how to change the size of a shadow.
	Skeleton Exoskeleton Endoskeleton Vertebrate Invertebrate Joint Muscle	Hard / soft / shiny / rough /smooth / absorbent Fossils Organic matter Crystals Mary Anning	Force Push / pull Friction surface Magnet Magnetic material Attract Repel Magnet poles	Flower / roots / stem / trunk / leaves Function Nutrition Reproduction Requirements – air / water / nutrients / room	Lifecycle Pollination Seed formation dispersal	Light / dark Reflect Surface Shadow / block Artificial / natural dangers
Y 5 / 6	Animals including Humans *Identify and name the main parts of the circulatory system in humans. *Be able to describe the function of the heart, blood vessels and blood and how it all works in simple terms. *Recognise the problems that can occur within the circulatory system and the impact these can have on a body.	Properties of Materials *Compare and group everyday materials by their properties. *Understand what is meant by hardness, solubility, transparency, conductivity, response to magnets. *Be able to name some materials that dissolve in liquids to form a solution.	Forces *To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. *To identify the effects of air resistance, water resistance and friction, that act between moving surfaces. * To recognise that some mechanisms, including levers, pulleys and gears,	Animals including Humans *To know the stages in the growth and the development of animals and humans. *To describe the changes that occur as a foetus develops until the time of birth. *To understand the changes that occur during puberty in both sexes.	Light *Understand and name and explain the function of each part of the eye and how it aids us to see. *To understand that light travels in a straight line and how this helps us to see objects using reflected light. *Understand how light from a light source travels to our eyes or to an object.	Earth & Space *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



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		<p>*Investigate dissolving in a practical way and record.</p> <p>*To be able to describe how to recover a substance from a solution – record investigations and results seen.</p>	allow a smaller force to have a greater effect.	<p>*To describe and explain the changes as humans develop from baby to old age.</p> <p>*To explain changes that occur in old age and what is meant by life expectancy.</p>	<p>*Relate the idea of light travelling in a straight line to explain how shadows have the same shape as the object making them.</p>	explain day and night and the apparent movement of the sun across the sky
	<p>Organs / skeleton / muscle</p> <p>Circulatory system</p> <p>Blood / heart / blood vessels</p> <p>Impact – diet, drugs, exercise, lifestyle damage</p>	<p>Solubility hardness</p> <p>Transparency</p> <p>Conduction</p> <p>Solution dissolve</p>	<p>Air resistance</p> <p>Water resistance</p> <p>Gravity</p> <p>Friction force</p> <p>Mechanisms</p> <p>Levers</p> <p>pulleys</p>	<p>Newborn foetus</p> <p>Infancy gestation</p> <p>Childhood puberty</p> <p>Adolescence</p> <p>Early adulthood</p> <p>Middle adulthood</p> <p>Late adulthood</p>	<p>Light</p> <p>Dark</p> <p>Reflect / reflection</p> <p>Surface</p> <p>Shadow</p> <p>Periscope / rainbow</p> <p>Artificial / natural / sunlight</p>	<p>Planet astronomy</p> <p>Gravity asteroid</p> <p>Solar system</p> <p>Orbit</p> <p>Satellite</p> <p>NASA</p> <p>Universe</p>