

# Foston CE, Terrington CE VA & Stillington Primary Schools Progression Map

## 'Love, Learn & Grow Together'

### Subject: Chemistry

#### Investigating Materials

### Subject Intent:

Within our Federation of schools, we intend that all our children will develop a deep curiosity about the world around them, and to experience the wonder which comes with gaining a knowledge and understanding about the processes and systems they can and can't see.

Our children will further develop:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings;
- Confidence and competence in the full range of practical skills;
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations;
- Scientific enquiry skills to be embedded in each topic throughout the school to allow the children to build upon prior knowledge;
- The ability to undertake practical work in a variety of contexts;
- Have a clear understanding of the jobs available from science specialisms.

Key Concept	Overview	EYFS	Key Stage 1	Key Stage 2	
Investigating Materials	Topic		<b>Changes in Materials</b>	<b>States of Matter (Y3) / Separating Mixtures (Y5) / Properties of Materials</b>	
	Milestones/ NC	3-4 yrs -Use their senses in hands-on exploration of natural materials. -explore collections of materials with similar and/or different properties.	Distinguish between an object and the material from which it is made.  Identify and name a variety of everyday materials, including	<b>LKS2</b>  <b>Rocks and Soils (Y3 topic)</b>  Compare and group together different kinds of rocks on the basis of their simple, physical properties.	<b>UKS2</b>  Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.

		<p>-to explore how things work.</p> <p>-make imaginative and complex 'small worlds' with blocks and construction kits.</p> <p>-join different materials freely and explore different textures.</p>	<p>wood, plastic, glass, metal, water and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.</p>	<p>Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p> <p><b>States of Matter</b></p> <p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C),</p>	<p>Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>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,</p>
--	--	--	--	--	--

				<p>building on their teaching in mathematics.</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>oxidisation and the action of acid on bicarbonate of soda.</p>
Knowledge	<p>To know how to use their senses in hands-on exploration of natural materials.</p> <p>To explore collections of materials with similar and/or different properties.</p> <p>To explore how things work.</p> <p>To make imaginative and complex 'small worlds' with blocks and construction kits.</p> <p>To join different materials freely and explore different textures.</p>	<p>That there is a difference between an object and the material from which it is made.</p> <p><b>Specific example/s to be taught:</b>  Dress- fabric  Chair – wood  Car – metal  Mugs – ceramic  Window – glass  Toy duck – plastic  Elastic bands – rubber  Books – paper.</p> <p>-</p> <p>That everyday objects are made out of different materials, including wood,</p>	<p><b>Rocks and Soils</b></p> <p>That different kinds of rocks can be compared and grouped according to their basic physical properties.</p> <p><b>Specific example/s to be taught:</b>  Igneous – obsidian, granite, basalt  Sedimentary – chalk, sandstone, limestone,  Metamorphic – marble, quartzite, slate.</p> <p>-</p> <p>That the properties of rocks can be related to their formation.</p>	<p>To compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.</p> <p><b>Specific example/s to be taught:</b>  Examples of each type of the following materials: plastic, wood, metal, paper, synthetic fabric, natural fabric, ceramic, glass, stone, rubber, water.</p> <p>Each type of material to be tested for: hardness, solubility, electrical and thermal conductivity, magnetism.</p> <p>-</p>	

			<p>plastic, glass, metal, water and rock.</p> <p><b>Specific example/s to be taught:</b> fabric, wood, ceramic, plastic, rubber, paper, brick, rock, glass, metal, water, leather.</p> <p>-</p> <p>That everyday materials have a variety of different properties.</p> <p><b>Specific example/s to be taught:</b> Flexible, hard, transparent,</p> <p>To be able to compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p><b>Specific example/s to be taught:</b> Transparent, flexible, objects which sink, soft objects, objects which feel cold, plastic, stretchy, objects which absorb water, metal objects.</p> <p>-</p>	<p><b>Specific example/s to be taught:</b> Large grain size in granite = slower cooling time. Smaller grain size in granite = faster cooling time.</p> <p>-</p> <p>That fossils are formed when things that have lived are trapped within sedimentary rock.</p> <p><b>Specific example/s to be taught:</b> Fossils found in shale, sandstone and limestone.</p> <p>-</p> <p>That soils are made from rocks and organic matter.</p> <p><b>Specific example/s to be taught:</b> Clay, sandy, chalky.</p> <p>-</p> <p>That materials can be grouped together according to whether they are solids, liquids or gases.</p>	<p>To understand that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</p> <p><b>Specific example/s to be taught:</b> Salt water Sugar water Sand water Flour water</p> <p>-</p> <p>To use their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p><b>Specific example/s to be taught:</b> Mixtures: Sand and water Sand and iron filings Salt water Sand and gravel Sand and small stones</p> <p>Methods: Picking out by hand</p>
--	--	--	--	---	---

			<p>That the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p><b>Specific example/s to be taught:</b> Plasticine, coin, paper clip, ruler, tennis ball, Blu-tak, marble, pencil.</p> <p>-</p> <p>That different everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard, are best used for particular uses.</p> <p><b>Specific example/s to be taught:</b> Leather- flexible Fabric – opaque Bricks – strong Paper – smooth</p>	<p><b>Specific example/s to be taught:</b> Any solid, water, oxygen, water vapour.</p> <p>-</p> <p>That some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics.</p> <p><b>Specific example/s to be taught:</b> Water, butter, chocolate, iron, mercury</p> <p>-</p> <p>That evaporation and condensation both play parts in the water cycle, and that the rate of evaporation is associated with temperature.</p> <p><b>Specific example/s to be taught:</b> Evaporation, condensation, precipitation, transpiration.</p>	<p>Decanting Sieving Filtering Using a magnet</p> <p>-</p> <p>To be able to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p><b>Specific examples/s to be taught:</b> Metals, fabrics, plastics, glass, wood, leather.</p> <p>-</p> <p>To be able to demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p><b>Specific examples/s to be taught:</b> Dissolving sugar in water Filtering sand and water Sea water evaporating Ice cubes Melting chocolate Water vapour condensing into cloud</p> <p>-</p> <p>To be able to explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible,</p>

					<p>including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda.</p> <p><b>Specific examples/s to be taught:</b>  Rusting iron key  Hard-boiled egg  Baking dough into bread  Burned paper</p>
Vocabulary	Soft Smooth Hard Rough Flexible Smell, taste and touch, Metal Wood Glass Plastic Solid Liquid Gas	<p><b>Soft</b> –easily moulded</p> <p><b>Smooth</b> –free from bumps</p> <p><b>Hard</b>- not easily moulded</p> <p><b>Rough</b>- unsmooth surface</p> <p><b>Senses</b>- sight, hearing, smell, taste and touch</p> <p><b>Metal</b> – conducts heat and electricity well</p> <p><b>Wood</b> –substance from trees</p> <p><b>Glass</b> –hard usually transparent substance used for windows, glasses etc</p> <p><b>Plastic</b>- synthetic product that can be formed into any shape</p> <p><b>Solid</b>- has definite shape</p> <p><b>Liquid</b>- can be poured.</p>	<p><b>Rocks and Soils vocabulary</b></p> <p><b>Igneous rock</b> – Rock that has been formed from magma or lava</p> <p><b>Sedimentary rock</b> – rock which has been formed by layers of sediment being pressed down hard and sticking together.</p> <p><b>Metamorphic rock</b> – rock which started out as igneous or metamorphic rock, but which changed due to being exposed to extreme heat or pressure.</p> <p><b>Magma</b> – molten rock which remains underground.</p> <p><b>Lava</b> – Molten rock which comes out of the ground.</p> <p><b>Sediment</b> – Natural solid material which is moved and</p>	<p><b>Materials</b> – The substance that something is made out of, e.g. wood, plastic, metal.</p> <p><b>Solids</b> – One of the three states of matter. Solid particles are very close together, meaning solids, such as wood and glass, hold their shape.</p> <p><b>Liquids</b> – This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk.</p> <p><b>Gases</b> – One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around. A gas fills its container, taking both the shape and the volume of the container. Examples of gases are oxygen and helium.</p>	

			<p><b>Gas</b>- fills the space.</p> <p><b>Flexible</b> – can bend.</p> <p><b>Rigid</b> – does not bend.</p> <p><b>Brittle</b> - breaks easily.</p> <p><b>Opaque</b> – Can't see through it.</p> <p><b>Transparent</b> – Can see through it.</p>	<p>dropped off in a new place by water or wind (eg sand).</p> <p><b>Permeable</b> – Allows liquid to pass through it.</p> <p><b>Impermeable</b> – Does not allow liquids to pass through it.</p> <p><b>Fossilisation</b> – the process by which fossils are made.</p> <p><b>Palaeontology</b> – the study of fossils.</p> <p><b>Erosion</b> – When water, wind or ice wears away land.</p> <p><b>States of Matter vocabulary</b></p> <p><b>States of matter</b> - Materials can be one of three states: solids, liquids or gases. Some materials can change from one state to another and back again.</p> <p><b>Solids</b> - These are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them.</p>	<p><b>Mixture</b> – When two or more substances are mixed, but not chemically joined together.</p> <p><b>Filter</b> – When you remove insoluble particles from a liquid by passing it through a barrier, such as a filter paper.</p> <p><b>Evaporate</b> – When a liquid turns into a gas or vapour.</p> <p><b>Soluble</b> – If a substance is <b>soluble</b> it can dissolve into something else. This substance is known as the solute</p> <p><b>Solute</b> – If a substance is soluble it can dissolve into something else. This substance is known as the solute.</p> <p><b>Solvent</b> – A solvent is a substance which breaks down another substance, eg hot water is a solvent for sugar.</p> <p>Solution – A mixture of two or more substances which remain equally mixed.</p> <p><b>Dissolve</b> - When a substance is added to a solvent and disappears, we say it has dissolved. Eg, coffee</p>
--	--	--	---	--	--

				<p><b>Liquids</b> - Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured.</p> <p><b>Gases</b> - Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.</p> <p><b>Water vapour</b> - This is water that takes the form of a gas. When water is boiled, it evaporates into a water vapour.</p> <p><b>Melt</b> – when a solid changes to a liquid.</p> <p><b>Freeze</b> - Liquid turns to a solid during the freezing process.</p> <p><b>Evaporate</b> - Turn a liquid into a gas.</p> <p><b>Condense</b> - Turn a gas into a liquid.</p> <p><b>Precipitation</b> - Liquid or solid particles that fall from a cloud as rain, sleet, hail or snow.</p>	<p>granules are added to a solvent (the hot water) and dissolve to form a solution.</p>
--	--	--	--	--	---



				<p><b>Transpiration</b> - Water from plants and trees enter the water cycle through transpiration, which is the process by which water travels through the roots and is released by the leaves into the atmosphere.</p> <p><b>Temperature</b> - Temperature is the amount of heat in something.</p> <p><b>Boiling point</b> - The temperature at which a solid or liquid becomes a gas is called the boiling point.</p> <p><b>Melting point</b> - The temperature at which a substance becomes a liquid is called the melting point.</p> <p><b>Particles</b> - A particle is the smallest possible unit of matter.</p> <p><b>Energy</b> - Energy is the ability to do work.</p> <p><b>Changes of state</b> - The process to describe the process of changing from state to another, eg from a solid to a liquid.</p> <p><b>Opaque</b> – Light doesn't travel through.</p>	
--	--	--	--	---	--

