

<b><u>Science Progression of Knowledge</u></b>		<b>Year 1</b>	<b>Topic: Materials – Everyday Materials</b>
<b><u>National Curriculum Objectives:</u></b>	<b><u>Essential Vocabulary:</u></b>	<b><u>Substantive Knowledge:</u></b> - children MUST know this by the end of the unit	<b><u>Working Scientifically Objectives:</u></b>
<ul style="list-style-type: none"> <li>distinguish between an object and the material from which it is made</li> <li>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li> <li>describe the simple physical properties of a variety of everyday materials</li> <li>compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	<ul style="list-style-type: none"> <li><u>Names of materials:</u> wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric.</li> <li><u>Properties of materials:</u> <b>hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent, sharp, stiff.</b></li> <li><u>Other:</u> <b>object.</b></li> </ul>	<ul style="list-style-type: none"> <li>There are different materials</li> <li>Materials have describable properties</li> <li>Objects are made from a variety of materials. Wood is from trees. Metal and rock come from the ground. Plastic and glass are manufactured.</li> <li>A property is how a material feels or looks.</li> <li>Different materials have different properties.</li> <li>Explain why some materials are better suited for different purposes than others.</li> </ul> <p>A variety of materials explored throughout KS1 through different topics. All classes of materials will be covered across the two year groups.</p>	<ul style="list-style-type: none"> <li>Follow instructions to perform a simple test to see whether a material is waterproof or not.</li> <li>Use my observations to suggest which materials would be best for an umbrella.</li> </ul>
<b><u>Prior Knowledge:</u></b>	<b><u>Future Knowledge:</u></b>	<b><u>Working at Greater depth:</u></b>	<b><u>Science Enquiry/Key Questions:</u></b>
<b>In EYFS children should:</b> <ul style="list-style-type: none"> <li>Be able to ask questions about the place they live.</li> <li>Talk about why things happen and how things work.</li> <li>Discuss the things they have observed such as natural and found objects.</li> <li>Manipulates materials to achieve a planned effect.</li> </ul>	<b>In Year 2 children will learn:</b> <ul style="list-style-type: none"> <li>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul>	<ul style="list-style-type: none"> <li>Can they describe things that are similar and different between materials?</li> <li>Can they explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate?</li> <li>Can they explain what happens to certain materials when they are cooled, e.g. jelly, heated chocolate?</li> </ul>	<ul style="list-style-type: none"> <li>What is the best material for an umbrella?</li> <li>Which materials are the most flexible?</li> <li>Which materials are the most absorbent?</li> <li>Which materials can be recycled?</li> </ul>

**Science Progression of Knowledge****Year 2****Topic: Materials - Use of Everyday Materials**

<b><u>National Curriculum Objectives:</u></b>	<b><u>Essential Vocabulary:</u></b>	<b><u>Substantive Knowledge:</u></b> - children MUST know this by the end of the unit	<b><u>Working Scientifically Objectives:</u></b>
<ul style="list-style-type: none"><li>• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li><li>• find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li></ul>	<ul style="list-style-type: none"><li>• <u>Changing shape:</u> squash, bend, twist, stretch.</li><li>• <u>Properties of materials:</u> e.g. strong, flexible, light, hard-wearing, elastic.</li><li>• <u>Other:</u> suitability, recycle, pollution.</li></ul>	<ul style="list-style-type: none"><li>• Solids can change shape when they are squashed, bent, twisted or stretched.</li><li>• A material's properties affect its uses.</li></ul> <p>A variety of materials explored throughout KS1 through different topics. All classes of materials will be covered across the two year groups.</p>	<ul style="list-style-type: none"><li>• Suggest different ways of sorting materials based on their properties and characteristics.</li><li>• Sort materials into those that are natural and those that are man-made.</li><li>• Experiment with what happens to different materials when you bend, twist, stretch and squash them, recording my observations.</li><li>• Make predictions about how materials will behave.</li><li>• Experiment with ways of making a paper bridge that is strong enough to hold a toy car.</li></ul>
<b><u>Prior Knowledge:</u></b>	<b><u>Future Knowledge:</u></b>	<b><u>Working at Greater depth:</u></b>	<b><u>Science Enquiry/Key Questions:</u></b>
<b>In Year 1 children should:</b> <ul style="list-style-type: none"><li>• distinguish between an object and the material from which it is made</li><li>• identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li><li>• describe the simple physical properties of a variety of everyday materials</li><li>• compare and group together a variety of everyday materials on the basis of their simple physical properties.</li></ul>	<b>In Year 3 children will learn:</b> <ul style="list-style-type: none"><li>• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li><li>• describe in simple terms how fossils are formed when things that have lived are trapped within rock</li><li>• recognise that soils are made from rocks and organic matter.</li></ul>	<ul style="list-style-type: none"><li>• Can they describe the properties of different materials using words like, transparent or opaque, flexible, etc.?</li><li>• Can they sort materials into groups and say why they have sorted them in that way?</li><li>• Can they say which materials are natural and which are man-made?</li><li>• Can they explain how materials are changed by heating and cooling?</li><li>• Can they explain how materials are changed by bending, twisting and stretching?</li><li>• Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted?</li></ul>	<ul style="list-style-type: none"><li>• Testing the elasticity of different pairs of tights.</li><li>• Which material would be best for the roof of the little pig's house?</li><li>• Which materials are shiny and which are dull?</li><li>• Can we change materials? How do we choose the best material?</li></ul>

<b>Science Progression of Knowledge</b>		<b>Year 3</b>	<b>Topic: Materials – Rocks and Soils</b>
<b><u>National Curriculum Objectives:</u></b>	<b><u>Essential Vocabulary:</u></b>	<b><u>Substantive Knowledge:</u></b> - children MUST know this by the end of the unit	<b><u>Working Scientifically Objectives:</u></b>
<ul style="list-style-type: none"> <li>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>recognise that soils are made from rocks and organic matter.</li> </ul>	<ul style="list-style-type: none"> <li><b><u>Types of rock:</u></b> <b>sedimentary rock, igneous rock, metamorphic rock.</b></li> <li><b><u>Properties of rocks:</u></b> permeable, semi-permeable, impermeable, durable.</li> <li><b><u>Names of rocks:</u></b> e.g. marble, chalk, granite, sandstone, slate.</li> <li><b><u>Formation of rocks and fossils:</u></b> natural, human-made, <b>magma, lava</b>, molten rock, <b>sediment, erosion, fossilisation</b>, layers, bone, fossil.</li> <li><b><u>Soil:</u></b> sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost.</li> <li><b><u>Other:</u></b> <b>palaeontology.</b></li> </ul> <p>Previously introduced vocabulary: soil, <b>water</b>, air.</p>	<ul style="list-style-type: none"> <li>There are different kinds of rocks.</li> <li>Different rocks have different physical properties and appearance</li> <li>Soil is formed from rocks and organic matter.</li> <li>Fossils form of evidence about creatures from the past.</li> <li>Fossils are formed when things that have lived are trapped within rock.</li> </ul>	<ul style="list-style-type: none"> <li>Classify rocks that are natural and those that are man-made.</li> <li>Identify a variety of natural and man-made rocks in my local environment.</li> <li>Suggest which criterion has been used to sort rocks into two groups.</li> <li>Sort rocks into Venn diagrams and Carroll diagrams based on specific criteria.</li> <li>Use my own criteria for sorting rocks into a Carroll diagram.</li> <li>Generate ideas for an experiment to test different rocks to see how much they erode.</li> <li>Carry out an experiment to test the erosion rate of different rocks, making predictions and recording my findings appropriately.</li> <li>Use a variety of sources of information to help me find out about specific rocks and their uses.</li> <li>Use observation to explore different soil samples and rank them according to different criteria.</li> <li>Classify fossil samples according to various criteria.</li> </ul>
<b><u>Prior Knowledge:</u></b>	<b><u>Future Knowledge:</u></b>	<b><u>Working at Greater depth:</u></b>	<b><u>Science Enquiry/Key Questions:</u></b>
<b>In Year 2 children should:</b> <ul style="list-style-type: none"> <li>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul>	<b>In Year 4 children will learn:</b> <ul style="list-style-type: none"> <li>compare and group materials together, according to whether they are solids, liquids or gases</li> <li>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)</li> <li>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<ul style="list-style-type: none"> <li>Can they classify igneous and sedimentary rocks?</li> <li>Can they begin to relate the properties of rocks with their uses?</li> </ul>	<ul style="list-style-type: none"> <li>How does adding different amounts of sand to soil affect how quickly water drains through it?</li> <li>Which soil absorbs the most water?</li> <li>How are the soils different?</li> <li>How many soil types have we found?</li> <li>How might the soil be different in different countries?</li> <li>What rock is best for a kitchen chopping board?</li> <li>What types of rocks are there?</li> <li>How do rocks change?</li> <li>Why do you think worms are important to the creation of soil?</li> <li>How can we use composting to make our own soil?</li> <li>How are fossils created?</li> <li>Why do fossils help us find out about historical events?</li> </ul>

<b>Science Progression of Knowledge</b>		<b>Year 4</b>	<b>Topic: Materials – States of Matter</b>
<b><u>National Curriculum Objectives:</u></b>	<b><u>Essential Vocabulary:</u></b>	<b><u>Substantive Knowledge:</u></b> - children MUST know this by the end of the unit	<b><u>Working Scientifically Objectives:</u></b>
<ul style="list-style-type: none"> <li>compare and group materials together, according to whether they are solids, liquids or gases</li> <li>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)</li> <li>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<ul style="list-style-type: none"> <li><b><u>States of matter:</u> solids, liquids, gases, particles.</b></li> <li><b><u>State change:</u> evaporate, condense, melt, freeze, heat, cool, melting point, freezing point, boiling point, water vapour.</b></li> <li><b><u>Water cycle:</u> precipitation, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail.</b></li> <li><b><u>Other:</u> atmosphere.</b></li> </ul> <p>Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide</p>	<ul style="list-style-type: none"> <li>Materials can be divided into solids, liquids and gases.</li> <li>Solids, liquids and gases are described by observable properties</li> <li>Heating causes solids to melt into liquids and liquids to evaporate to gases</li> <li>Cooling causes gases to condense to liquids and liquids to freeze to solids</li> <li>The temperatures at which given substances change state are always the same.</li> <li>Materials change state by heating and cooling.</li> <li>Some changes can be reversed and some can't.</li> <li>When two or more substances are mixed and remain present the mixture can be separated.</li> </ul>	<ul style="list-style-type: none"> <li>Compare and classify materials according to whether they are solids or liquids.</li> <li>Carry out an investigation to see if air weighs anything and report on my findings.</li> <li>Draw diagrams to show how the particles in solids, liquids and gases behave differently.</li> <li>Classify objects and materials into those that would melt and those that wouldn't.</li> <li>Plan and carry out an experiment to see which materials melt at room temperature, and record my findings.</li> <li>Record information about the melting points of different materials in bar graphs, using the data to answer questions.</li> <li>Draw diagrams and use written examples to show the processes of evaporation and condensation.</li> <li>Label a diagram of the water cycle to show what is happening</li> </ul>
<b><u>Prior Knowledge:</u></b>	<b><u>Future Knowledge:</u></b>	<b><u>Working at Greater depth:</u></b>	<b><u>Science Enquiry/Key Questions:</u></b>
<p><b>In Year 3 children should:</b></p> <ul style="list-style-type: none"> <li>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>recognise that soils are made from rocks and organic matter.</li> </ul>	<p><b>In Year 5 children will learn:</b></p> <ul style="list-style-type: none"> <li>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</li> <li>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>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</li> </ul>	<ul style="list-style-type: none"> <li>Can they group and classify a variety of materials according to the impact of temperature on them?</li> <li>Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?</li> </ul>	<ul style="list-style-type: none"> <li>What liquid solution enables ice to melt the quickest?</li> <li>How does the mass of a block of ice affect how long it takes to melt?</li> <li>How does the surface area of water affect how long it takes to evaporate?</li> <li>Does seawater evaporate faster than fresh water?</li> <li>Can you group these materials and objects into solids, liquids, and gases?</li> <li>What is the melting temperature of ice and how does it compare with the freezing temperature of water?</li> <li>Is the melting temperature of wax the same as its freezing temperature?</li> </ul>

<b>Science Progression of Knowledge</b>		<b>Year 5</b>	<b>Topic: Materials – Properties and Changes of Materials</b>	
<b><u>National Curriculum Objectives:</u></b>	<b><u>Essential Vocabulary:</u></b>	<b><u>Substantive Knowledge:</u></b> - children MUST know this by the end of the unit	<b><u>Working Scientifically Objectives:</u></b>	
<ul style="list-style-type: none"> <li>• 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</li> <li>• know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>• demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>• 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</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>Properties of materials:</u></b> thermal <b>conductor/insulator</b>, magnetism, electrical resistance, <b>transparency</b>.</li> <li>• <b><u>Mixtures and solutions:</u></b> dissolving, substance, soluble, insoluble.</li> <li>• <b><u>Changes of materials:</u></b> reversible change, physical change, irreversible change, chemical change, burning, new material, product.</li> <li>• <b><u>Separating:</u></b> sieving, filtering, magnetic attraction.</li> </ul> <p>Previously introduced vocabulary: electrical <b>conductor/insulator</b>, bulb, <b>translucent</b>.</p>	<ul style="list-style-type: none"> <li>• All matter (including gases) has mass.</li> <li>• Heating can sometimes cause materials to change permanently. When this happens, a new substance is made.</li> <li>• These changes are not reversible.</li> <li>• Sometimes mixed substances react to make a new substance. These changes are usually irreversible.</li> </ul>	<ul style="list-style-type: none"> <li>• Mix a variety of materials with water to see whether they will dissolve, float, sink or react, recording the results in a table.</li> <li>• Classify materials depending on whether they dissolve, float, sink or react when mixed with water.</li> <li>• Investigate different irreversible changes by mixing different materials together, observing the results and explaining what has happened.</li> <li>• Compare and classify a variety of everyday materials based on their properties.</li> <li>• Carry out a variety of investigations to explore the properties of materials to see if they e.g. conduct electricity, are magnetic, are soluble, etc.</li> <li>• Give reasons, based on evidence from comparative and fair tests, for uses of everyday materials.</li> <li>• Plan, set up and carry out a fair test, drawing conclusions and presenting the results.</li> </ul>	
<b><u>Prior Knowledge:</u></b>	<b><u>Future Knowledge:</u></b>	<b><u>Working at Greater depth:</u></b>	<b><u>Science Enquiry/Key Questions:</u></b>	
<b>In Year 4 children should:</b> <ul style="list-style-type: none"> <li>• compare and group materials together, according to whether they are solids, liquids or gases</li> <li>• 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)</li> <li>• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<b>In KS3 children will learn about:</b> <ul style="list-style-type: none"> <li>• the concept of a pure substance mixtures, including dissolving</li> <li>• diffusion in terms of the particle model</li> <li>• simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography</li> <li>• the identification of pure substances</li> </ul>	<ul style="list-style-type: none"> <li>• Can they describe methods for separating mixtures? (filtration, distillation)</li> <li>• Can they work out which materials are most effective for keeping us warm or for keeping something cold?</li> <li>• Can they use their knowledge of materials to suggest ways to classify? (solids, liquids, gases)</li> <li>• Can they explore changes that are difficult to reverse, e.g. burning, rusting and reactions such as vinegar with bicarbonate of soda?</li> <li>• Can they explore the work of chemists who created new materials, e.g. Spencer Silver (glue on sticky notes) or Ruth Benerito (wrinkle free cotton)?</li> </ul>	<ul style="list-style-type: none"> <li>• How can marbles, flour, and sugar be separated from water?</li> <li>• What variables affect dissolving?</li> <li>• Does mixing cause reversible or irreversible changes?</li> <li>• Does heating cause reversible or irreversible changes?</li> <li>• Can you group these materials based on whether they are transparent or not?</li> </ul>	

