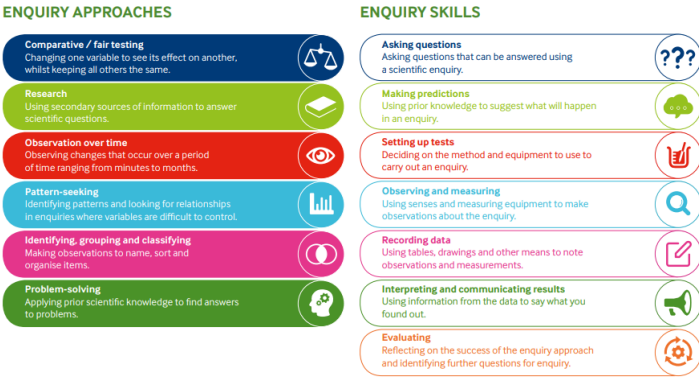


Year Group:	1	Strand: 1	What are things made from?
CHEMISTRY			
<b>Key NC Reference and Objectives</b>	<ul style="list-style-type: none"> <li>• Distinguish between an object and the material from which it is made</li> <li>• Identify and name a variety of everyday materials, including wood, plastic, glass, 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>Enquiry Approaches and Skills in Science</b>			
<b>Key Investigation</b>	<ul style="list-style-type: none"> <li>- Investigating the physical properties of a range of materials  <b>Enquiry Approach: Problem solving, Research</b>  <b>Enquiry Skills: Making predictions, interpreting and communicating results, evaluating</b>  <b>Guidance:</b>  Inspired by the story the three little pigs, give children a range of materials (e.g. cocktail sticks, spaghetti, dominoes, sugar cubes, pipe cleaners, marshmallows, wine gums, drinking straws), and ask them to build a house for the pigs. Give each group time to plan and build their house. Then let a hairdryer stand in for the big bad wolf – see if each house can withstand a huff and a puff. At the end, discuss the results with the children. Discussion should include commenting on the findings - which designs withstood the hairdryer? Why were these houses stronger than others? What other materials could they have tried? Pupils could rank the materials based on how long they withstood the hairdryer. Children can evaluate their choice and suggest how they could change this next time, or redo the experiment to reflect their findings.</li> <li>- Making comparisons between different materials  <b>Enquiry Approach: Comparative/fair testing</b>  <b>Enquiry Skills: Making predictions, setting up tests, recording data, interpreting and communicating results</b>  <b>Guidance:</b> Children could test pieces of different carrier bags to see which is the strongest. Cut out equal-sized rectangles and hang with bulldog clips (or make holes with a punch). Add weights and see how much each bag stretches. How much weight/how many weights each bag can support could be recorded using block or bar graphs. Some discussion on fair testing can take place, all of the weights should have the same mass and the carrier bags should all be the same size.</li> </ul>		
<b>Other suggestions for investigations and activities</b>	<ul style="list-style-type: none"> <li>- Identifying materials in the environment, understanding the difference between an object and its material  <b>Enquiry Approach: Identifying, grouping and classifying</b>  <b>Enquiry Skills: Recording data</b>  <b>Guidance:</b>  Take the children on a walk around the school and look for examples of different materials. Discuss why each material was used for that particular job. Use a digital camera to record examples. Clarify the difference between the object and the material it is made from.</li> </ul>		

	<p>- Grouping materials by their properties</p> <p><b>Enquiry Approach: Identifying, grouping and classifying</b></p> <p><b>Enquiry Skills: Recording data, communicating results</b></p> <p><b>Guidance:</b></p> <p>Put the children into groups and hand out objects made from a range of materials. Ask them to choose a property and sort the materials based on that property (e.g. flexible or not flexible). When they are done, ask them to look at the sorted objects of another group – can they deduce what property that group used to sort the objects?</p> <p><b>Extension for Greater Depth:</b></p> <p>Performing simple tests to explore questions, for example: ‘What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’</p>		
<p><b>Key scientists to learn about</b></p>	<p>N/A</p>		
<p><b>Previously Taught Vocabulary</b></p>	<p><b>hard, soft, bendy, not bendy, shiny, dull, strong, stretchy, stiff, rough, smooth, waterproof, not waterproof</b> Pupils will have encountered many of the key vocabulary in everyday language rather than in a scientific context.</p>		
<p><b>New Key Vocabulary</b></p>	<table border="1"> <tr> <td data-bbox="389 741 943 1532"> <p><b>Object:</b> a thing that can be used e.g. a pencil, door, a car</p> <p><b>Material:</b> something that an object is made of e.g. wood, plastic</p> <p><b>When discussing common properties of materials:</b></p> <p><b>Hard:</b> it is not easily broken or bent</p> <p><b>Soft:</b> it is easy to change the shape of</p> <p><b>Rough:</b> it looks or feels bumpy or uneven</p> <p><b>Smooth:</b> it has no lumps or bumps</p> <p><b>Bendy:</b> it can be folded easily</p> <p><b>Stretchy:</b> it can be pulled and made longer or wider</p> <p><b>Waterproof:</b> it keeps water out and keeps things dry</p> <p><b>Not waterproof:</b> it lets water in and does not keep things dry</p> <p><b>Absorbent:</b> it soaks up water</p> <p><b>Not absorbent:</b> it does not soak up water</p> <p><b>Transparent:</b> you can see through it</p> <p><b>Opaque:</b> you cannot see through it</p> </td> <td data-bbox="943 741 1495 1532"> <p><b>Previously taught but now have more advanced definitions:</b></p> <p><b>See teaching notes within Core Substantive Knowledge for clarification on everyday vs. scientific vocabulary.</b></p> </td> </tr> </table>	<p><b>Object:</b> a thing that can be used e.g. a pencil, door, a car</p> <p><b>Material:</b> something that an object is made of e.g. wood, plastic</p> <p><b>When discussing common properties of materials:</b></p> <p><b>Hard:</b> it is not easily broken or bent</p> <p><b>Soft:</b> it is easy to change the shape of</p> <p><b>Rough:</b> it looks or feels bumpy or uneven</p> <p><b>Smooth:</b> it has no lumps or bumps</p> <p><b>Bendy:</b> it can be folded easily</p> <p><b>Stretchy:</b> it can be pulled and made longer or wider</p> <p><b>Waterproof:</b> it keeps water out and keeps things dry</p> <p><b>Not waterproof:</b> it lets water in and does not keep things dry</p> <p><b>Absorbent:</b> it soaks up water</p> <p><b>Not absorbent:</b> it does not soak up water</p> <p><b>Transparent:</b> you can see through it</p> <p><b>Opaque:</b> you cannot see through it</p>	<p><b>Previously taught but now have more advanced definitions:</b></p> <p><b>See teaching notes within Core Substantive Knowledge for clarification on everyday vs. scientific vocabulary.</b></p>
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<p><b>Core Substantive Knowledge and background teacher knowledge:</b></p>	<p><b>Many words that pupils use to describe objects and materials have everyday and scientific meanings. For example, a pupil might use the word ‘material’ to describe the fabric of their jumper. Pupils should initially be allowed to explore and discuss different materials and describe them using everyday words. The introduction of scientific terms should come after this and be explicitly clarified with pupils. Tell the children that they are learning to talk like scientists by using scientific language.</b></p> <p>A material is anything made from matter that can be shaped or manipulated in order to make something. A material is therefore anything that physically occupies space and has mass, which can be a solid, a liquid or a gas. The appearance and properties of materials may be used to group or classify them and determine their appropriateness for a specific function.</p> <p>Objects can be made from more than one material. When learning about materials, children should try to think about the role each part of an object plays – a school desk, for example, can be broken down into metal legs and a wooden top. Even simple objects such as pens or pencils are made from more than one material.</p> <p><b>Sorting and grouping materials:</b></p>		

We can group materials according to various properties:

- Texture – is it rough or smooth, hard or soft?
- Flexibility – can it bend or is it stiff?
- Water permeability – does it allow water to pass through it?
- Density and buoyancy – does it sink or float in water? Does it feel heavy or light?
- Is the material transparent, translucent or opaque?
- Is the material magnetic?
- Does it conduct or insulate heat and electricity? Does it feel cold to the touch?



**Different types of material have different general properties:**

<b>Metal</b>	Metals are shiny, strong and (usually) hard. They are good conductors of heat and electricity.
<b>Ceramic</b>	Ceramics are hard and strong but inflexible and brittle. They are good insulators of heat and electricity.
<b>Glass</b>	Glass is transparent. It is hard, but inflexible and brittle. It is a good insulator of heat and electricity.
<b>Plastics</b>	Plastics can be manufactured to have many different properties. Some can be transparent whilst others can be translucent or opaque. Some are flexible while others can be quite stiff. They are good insulators of heat and electricity.
<b>Fibres</b>	Fibres are flexible, but very strong. They are good insulators of heat and electricity. Optical fibres transmit light very efficiently.

**Choosing materials:**

The choice of materials used for constructing different buildings is very important. They need to be strong enough to support the weight of the structure, waterproof to keep the rain out etc.

There are many different ways to build a house. In some countries, houses are made out of clay bricks. Elsewhere, houses are made of wooden or bamboo.

Modern skyscrapers use a frame made of steel overlaid with glass and concrete. The materials and structural features used are based on the needs of the consumer. Clay bricks are suitable in hot, dry climates where people have less economic stability because they are cheap, easy to manufacture and waterproofing is not essential.



Bricks for wall and roof



Wood for window frames



Cement to make concrete



Steel for house frame




Stones to mix with cement



Glass for window

**Common misconceptions:**

	<p>Children can be confused about the meaning of the word ‘material’ – many might have heard the word only in the context of fabric. Clarification of the terms ‘object’ and ‘material’ during the unit is vital for developing their understanding and preventing creation of further misconceptions.</p> <p>Another common misconception is that materials are all solids – children might classify liquids and gases as non-materials. This misconception can be reinforced if the materials the children investigate include only solids such as wood, glass and plastic. Avoid this by including materials such as gases (air in a balloon) and liquids when discussing materials with the children.</p> <p><b>Interesting Fact:</b> Silk is a natural material made from silk worms. A single silk shirt takes over 1000 silk worms to make!</p> 
<p><b>Prior Knowledge</b></p>	<p>FS.1 Materials – Can I describe different materials? Observe and describe basic properties of different materials</p>
<p><b>Assessment</b></p>	<p>Thorough assessment of outcomes in books and folders, quizzes and written scientific investigations, also supported by observations and questioning in lessons, assessing the following:</p> <p>Substantive Knowledge:</p> <ul style="list-style-type: none"> <li>- Pupils can distinguish between an object and a material</li> <li>- Pupils can identify what materials an object is made from</li> <li>- Pupils can describe properties of everyday materials using some scientific terminology</li> </ul> <p>Disciplinary Knowledge:</p> <ul style="list-style-type: none"> <li>- Pupils have conducted simple tests into a material’s suitability</li> <li>- Pupils have recorded their findings following an investigation (e.g orally, video, written, pictogram)</li> <li>- Pupils have used compared different objects and materials based on their properties</li> <li>- Pupils have grouped different materials by their properties</li> </ul>
<p><b>Useful Planning Resources and Links</b></p>	<p>That’s Chemistry!: A Resource for Primary School Teachers about Materials and their Properties (Edited by Jan Rees)</p> <p>Royal Society of Chemistry primary resources: <a href="https://edu.rsc.org/resources/grouping-and-classifying-materials/1791.article">https://edu.rsc.org/resources/grouping-and-classifying-materials/1791.article</a></p>