

Study Guide - Science

Year: 5	Subject: Science	Unit of Study: Material World	Linked Literature: Itch by Simon Mayo / Amazing Materials by Rob Colson																																				
Out of this World	Material World	Circle of Life	Let's Get Moving	Growing Up and Growing Old	Amazing Changes																																		
<table border="1"> <thead> <tr> <th colspan="2">Vocabulary</th> </tr> </thead> <tbody> <tr> <td>Material</td> <td>The substance that something is made out of eg: wood, plastic</td> </tr> <tr> <td>Solid</td> <td>One of the three states of matter. Solid particles are very close together, meaning solids, such as wood and glass, hold their shape.</td> </tr> <tr> <td>Liquid</td> <td>This state of matter can flow and take the shape of a container because the particles are more loosely packed and can move around each other eg. milk and water.</td> </tr> <tr> <td>Gas</td> <td>A state of matter where the particles are further apart than solid or liquid particles and are free to move around eg: oxygen and helium.</td> </tr> <tr> <td>Dissolve</td> <td>When a solid mixes with liquid to make a solution</td> </tr> <tr> <td>Evaporate</td> <td>Heat liquid until it turns into a gas</td> </tr> <tr> <td>Condensing</td> <td>Cooling a gas or water vapour , turning it into a liquid</td> </tr> <tr> <td>Filter</td> <td>Use porous material to separate solid and liquid</td> </tr> <tr> <td>Mixture</td> <td>Two or more substances that can be separated</td> </tr> <tr> <td>Solution</td> <td>Mixture of solid and liquid—you may or may not be able to see the solid</td> </tr> <tr> <td>Soluble/insoluble</td> <td>When something can dissolve / cannot dissolve</td> </tr> <tr> <td>Conductor</td> <td>A material that heat or electricity can easily travel through. Most metals are both thermal (heat) and electrical (electricity) conductors.</td> </tr> <tr> <td>Solute</td> <td>The material that dissolves</td> </tr> <tr> <td>Insulator</td> <td>A material that does not let heat / electricity pass through them. Wood and plastic are both thermal (heat) and electrical insulators.</td> </tr> <tr> <td>Reversible/irreversible</td> <td>Can be changed back / cannot be changed back and often results in a new product being made.</td> </tr> <tr> <td>Transparent</td> <td>Lets light through so the object can be looked through eg: glass and some plastics.</td> </tr> </tbody> </table> <p>I need to know: Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency. For example, glass is used for windows because it is hard and transparent, whilst oven glove are made from a thermal insulator to prevent the heat from burning your hand. There are many ways to group materials based on these properties. Sometimes, the choice of materials can be a compromise giving consideration to other factors such as appearance, cost and comfort.</p> <p>States of matter: There are three states of matter—solid, liquid and gas. The particles in solids are closely packed together so solids hold their shape. In liquids the particles are more loosely packed, allowing them room to move around so liquids can be poured and flow. Particles in gases are spaced out and free to move around. This is represented in the diagram below.</p> <p>States of matter can be changed by melting (heating a solid until it changes to a liquid), freezing (cooling a liquid until it turns into a solid), evaporating (a liquid turns into a gas or vapour) or condensing (cooling a gas, or water vapour, turning it into a liquid). This is shown below.</p> <p>Solutions and mixtures: A mixture contains more than one substance. These are not chemically joined, which means they are easy to separate using their properties eg: size, magnetism and solubility. Mixtures can be a combination of any of the three states of matter. When a solid dissolves in a liquid it is known as a soluble solid (eg: sugar) and produces a solution. Materials that don't dissolve are known as insoluble (eg: sand). Solutions are usually transparent, even if it is coloured. When a solid is added to water (liquid), the water particles surround the solid edges. If the attraction between the water and solid particles, is greater than that between the solid particles then it will dissolve. This process is affected by things like temperature and the amount of solid. There is always a limit to how much solid can dissolve in a given amount of water/ liquid (saturated). It is important to recognise that a substance may dissolve in one liquid but not in another eg: nail varnish dissolves in acetone but not in water.</p> <p>I need to do: Compare and group together everyday materials on the basis of their properties. 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, for the particular uses of everyday materials. Demonstrate that dissolving, mixing and changes of state are reversible changes. Working scientifically skills: Plan different types of scientific enquiries to answer questions, recognising controlling variables. Use scientific equipment to take measurements. Record data and results, using these findings to make predictions and set up further comparative and fair tests. Report and present findings from enquiries. Identify scientific evidence that has been used to support or refute ideas/arguments.</p> <p>Prior knowledge: Through their previous learning, children should know:<ul style="list-style-type: none"> About everyday materials, their properties and uses (Y1/2) About magnetic materials (Y3) About rocks (Y3) About temperature, heating and cooling (Y4) The states of matter and change of state (Y4) About evaporation and condensation in the water cycle and the factors that affect evaporation (Y4) </p> <p>Common Misconceptions: That 'material' just means fabric—any kind of matter in the world around us. That 'everyday materials' are single substances —lots are mixtures or compounds like glass or brick. That 'dissolving' means that the substance has disappeared.</p> <p>Reversible and irreversible changes: Irreversible changes often result in a new product being made from the old materials and the original materials cannot be got back eg: burning wood produces ash. Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by sieving, filtering or evaporating (heating).</p> <p>When sieving, smaller materials are able to fall through the holes in the sieve, separating them from larger particles.</p> <p>When filtering, the solid particles will get caught in the filter paper but the liquid will be able to get through.</p> <p>Evaporation causes the liquid to change into a gas, leaving the solid particles behind.</p> <p>Scientist of the term: Sir Humphry Davy (1778-1829), an English chemist who was the first to isolate several chemical elements and found that nitrous oxide (laughing gas) had anaesthetic properties that could be useful in surgery. In 1815, he invented the Davy safety lamp for use in mines and was knighted in 1812 and baronet in 1818.</p>						Vocabulary		Material	The substance that something is made out of eg: wood, plastic	Solid	One of the three states of matter. Solid particles are very close together, meaning solids, such as wood and glass, hold their shape.	Liquid	This state of matter can flow and take the shape of a container because the particles are more loosely packed and can move around each other eg. milk and water.	Gas	A state of matter where the particles are further apart than solid or liquid particles and are free to move around eg: oxygen and helium.	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Master materials—sorting and describing	Insulating Investigation—thermal conductors	Solutions, solutions, solutions! - dissolving	How can mixtures be separated?	Irreversible or reversible change?	Investigation																																		