

Science

Year 5 – Aut 1 – Properties and Changes of Materials

<i>ities/listen-what-can-you-hear/material-world</i>	<i>ities/have-you-ever/tasted-sugar-in-your-cereal-milk</i>	<i>ities/whats-going-on/melting-ice-cubes</i>	<i>ities/odd-one-out/delicious-drinks</i>	<i>ities/odd-one-out/hot-drinks-for-cold-days</i>	<i>ities/have-you-ever/had-an-ice-cream-melt</i>	<i>ities/problem-solvers/clean-up-the-beach</i>
Success Criteria						
<p>I can name a variety of everyday materials</p> <p>I can use simple scientific vocabulary to explain the properties of everyday materials</p> <p>I can group and compare everyday materials based on their properties</p> <p>I can give reasons for particular uses of everyday materials.</p>	<p>I can explain what 'dissolving' means</p> <p>I know that some things dissolve in liquid</p> <p>I can tell you what a solution is</p> <p>I can give you an example recover a substance from a solution</p>	<p>I know what a solution is</p> <p>I know what dissolving means</p> <p>I know what mixing is</p> <p>I can explain the difference between melting, mixing and dissolving</p> <p>I can suggest answers to a question</p>	<p>I can plan a fair test</p> <p>I can identify one thing to change</p> <p>I can explain what needs to be measured</p> <p>I can talk about what needs to be kept the same and why.</p> <p>Use the fair test planning grid for this investigation!</p>	<p>I know what dissolving is</p> <p>I know what a reversible change is</p> <p>I can plan an investigation to answer a scientific question</p>	<p>I know what a reversible change is</p> <p>I can give some examples of reversible changes</p> <p>I can explain how I know it is a reversible change</p> <p>I know that mixing, dissolving and changes of state are reversible changes</p>	<p>I know how to separate materials</p> <p>I can explain what filtering is</p> <p>I can explain what sieving is</p> <p>I can talk about how evaporation can be used to separate mixtures</p> <p>I know that some materials are magnetic and some are not magnetic</p>
Suggested Outcome						
<p>Children could compare, group and label a wide variety of materials and objects.</p> <p>Which materials are transparent? Are they all magnetic? Which of the materials are soluble?</p>	<p>Children investigate a variety of kitchen cupboard solids dissolve when added to water. They record their results and group according to soluble and insoluble.</p> <p>Solids – different kinds of sugar or salt, flour, gravy granules, milkshake powder, hot choc, coffee, tea leaves, instant soup, peppercorns, mini marshmallows, jelly, hundreds and thousands and popping candy. Also include sand.</p> <p>Children can also give an example of how to recover a substance from a solution.</p>	<p>Children are presented with flour and uncooked rice (mixing)</p> <p>melted chocolate (melting)</p> <p>salty water (dissolving)</p> <p>they discuss how they could separate them.</p>	<p>Children plan a fair test identifying one thing to change, one thing to measure/observe and important factors to keep the same. E.g. We will change the type of liquid and measure the amount of time taken for the sugar to dissolve. We will keep the amount of liquid and the temperature of the liquid the same.</p>	<p>Children plan an investigation to recover the sugar from a cup of tea using their knowledge of states of matter.</p>	<p>Children can name and describe a number of everyday reversible changes. They could sort pictures of events into a table or write examples of the reversible changes.</p> <p>Examples – ice cubes, melting chocolate, salt and water etc</p> <p>Children know how to 'reverse' the change.</p>	<p>Children separate out wet and dry mixtures (flour and rice, water and salt, paperclips and sand etc)</p> <p>Children can discuss the differences between each process and why/why not each process is effective depending on the mixture.</p>

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Vocabulary	NC links
evaporating, filtering, sieving, melting, dissolving, liquid, solid, gas, substance, chemical, reaction, combine, reversible, irreversible, solvent, state, mixing, mixture, hardness, solubility, transparency, conductivity, electrical, thermal, burning, acid, solution	DT – suitability of material for purpose Geography - biomes
Key Learning	
<p>Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.</p> <p>Mixtures can be separated by filtering, sieving and evaporation.</p> <p>Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p>	
Possible Evidence	Common Misconceptions
<ul style="list-style-type: none"> • Can use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings • Can explain what dissolving means, giving examples • Can name equipment used for filtering and sieving • Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving • Can describe some simple reversible and non-reversible changes to materials, giving examples • Can create a chart or table grouping/comparing everyday materials by different properties • Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose • Can group solids based on their observations when mixing them with water • Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water • Can explain the results from their investigations 	<p>Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.</p> <p>Some children may think:</p> <ul style="list-style-type: none"> • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change.
Notable Scientists	
Sir Humphry Davy Jamie Garcia (invention of a new plastic) Becky Schroeder (fluorescence material) Spencer Silver, Arthur Fry and Alan Amron (post it notes) Ruth Benerito (wrinkle free cotton)	
CPD opportunity	
https://www.reachoutcpd.com/courses/upper-primary/changing-materials/	
Useful Links	

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- https://central.espresso.co.uk/espresso/modules/curriculum_browse/index.html?subject=nc2014:classification:862752&grade=y5
- <https://www.bbc.co.uk/bitesize/topics/zcuv4wx>
- <https://www.stem.org.uk/resources/community/collection/12742/year-5-properties-materials>

Materials

Early learning goal	<ul style="list-style-type: none">• Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.
Year 1	<ul style="list-style-type: none">• Distinguish between an object and the material from which it is made.• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.• Describe the simple physical properties of a variety of everyday materials.• Compare and group together a variety of everyday materials on the basis of their simple physical properties.
Year 2	<ul style="list-style-type: none">• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Year 3	<ul style="list-style-type: none">• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks)• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)• Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 - Forces and magnets)
Year 4	<ul style="list-style-type: none">• Compare and group materials together, according to whether they are solids, liquids or gases.• 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).• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.• Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)