

## Year 5 Science Curriculum

Working scientifically links   Rubric/PCMD opp.   Key Vocabulary

### Properties and Changes of Materials

**What's the big picture?** Recap knowledge from year 4 and children to generate own questions to investigate - *“I know how to ask simple scientific questions”*

#### Prior learning

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

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)

Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter)

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). (Y4 - States of matter)

Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)

National Curriculum Principles	Objectives	Knowledge and key Vocabulary	Reading opportunities	Technology
Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	<p>To know how a material dissolves to form a solution, explains the process of dissolving</p> <p>I know and can show how to recover a substance from a solution</p>	<p>Ch to know that some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.</p> <p>Children to <b>dissolve</b> salt in water and explore what happens - <b>solution, solute, soluble, insoluble</b>. Children to test whether 3 different substances dissolve in water eg salt, sand, powder paint (<b>mixture</b>)</p> <p><b>Investigate rates of dissolving using comparative/fair test.</b></p> <p><b>Children to investigate how to recover salt from a salt water solution - look at reversible change</b></p>	<p>Kensuke's Kingdom (Michael Morpurgo)</p> <p>The BFG (Roald Dahl)</p>	

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<p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated including through filtering, sieving and evaporating</p>	<p>I know how some materials can be separated</p> <p>I can demonstrate how materials can be separated through filtering, sieving and evaporating</p>	<p>Children to <b>investigate</b> sand and water mixture - how can they be <b>separated?</b> - children to <b>filter</b> the mixture, <b>using simple equipment.</b></p> <p>Children to <b>investigate how to separate mixtures with different sized particles</b> e.g. sand, salt and water. <b>sieving and filtering - reversible change, evaporation.</b></p> <p><b>Record data and findings</b></p>		
<p>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</p>	<p>I can compare and group materials based on their properties (hardness, solubility, transparency, conductivity, (electrical and thermal) and response to magnets)</p>	<p>Compare and group materials based on <b>hardness, solubility, transparency, electrical and thermal conductivity and response to magnets</b> - classify and grouping</p> <p>Introduce <b>thermal conductivity.</b></p> <p><b>Set up a comparative test e.g. which spoon will be best for scooping ice cream. Spoons in cups of ice - which one is the best thermal conductor (gets coldest)? Report findings, diagrams, labels... use outcomes to set up further tests.</b></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</p>	<p>I know and can demonstrate that some changes are reversible and some are not. I know about reversible and</p>	<p>Some changes to materials such as dissolving, mixing and changes of state are <b>reversible</b>, but some changes such as <b>burning wood, rusting</b> and mixing vinegar with bicarbonate of soda result in the formation of <b>new materials</b> and are <b>not reversible.</b></p> <p>- <b>children to explore non reversible changes e.g vinegar and bicarbonate of soda, burning, rusting (observe overtime and</b></p>		

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<p>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</p>	<p>irreversible changes</p>	<p>then write conclusion)</p> <p>Comparative and fair tests involving non reversible changes e.g. what affects the rate of rusting, what affects the amount of gas produced?</p>		
<p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials including metals, wood and plastics</p>	<p>I give evidenced reasons why materials should be used for specific purposes</p>	<p>Project link - ch to investigate the properties of different materials and why materials should be used for a specific purpose .</p> <p>Use secondary sources to research new materials produced by chemists.</p> <p>Children to create a double page spread</p>		

### Famous scientists

Jamie Garcia (BP website) - invention of a new plastic

Sir Humphrey Davy - separating gases

Spencer Silver - invented post it notes

### Common misconceptions

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.

Some children may think:

- 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

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- lit candles only melt, which is a reversible change.

### Enquiry ideas

<u>Comparative tests</u>	<u>Identify and classify</u>	<u>Observations over time</u>	<u>Pattern seeking</u>	<u>Research</u>
Which type of sugar dissolves the fastest?	Sort materials according to whether they dissolve or not?	What happens to a glass of salt water over time?	Do all sticky materials stretch in the same way?	What are micro plastics and how are they harming the planet?
how does temperature affect the rate of dissolving?		How do metal objects change over time?		