



Year 5 – Properties and changes of materials (biology, chemistry, physics)

NC objectives

- 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
- 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 from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

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)

Future Learning

- Chemical reactions as the rearrangement of atoms. (KS3)
- Representing chemical reactions using formulae and using equations. (KS3)
- Combustion, thermal decomposition, oxidation and displacement reactions. (KS3)
- Defining acids and alkalis in terms of neutralisation reactions. (KS3)
- The pH scale for measuring acidity/alkalinity; and indicators. (KS3)



<i>Key vocabulary</i>	<i>Common misconceptions</i>
<p>materials, solids, liquids, gases, melting, freezing, evaporating, condensing, dissolving, thermal/electrical conductor, thermal/electrical insulator, transparency, mixture, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting.</p>	<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.
<i>Areas of enquiry</i>	<i>Hook suggestions</i>
<ul style="list-style-type: none">• Observation over time – evaporation (see scenario)• Comparative and fair testing - Investigate rates of dissolving.• Identifying and classifying – group and classify materials according to their properties.• Pattern seeking – do all stretchy materials stretch in the same way?• Research using secondary sources – find out about new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).	<p><u>Books</u></p> <ul style="list-style-type: none">• Charlie and the Chocolate factory by Roald Dahl• George’s Marvellous Medicine by Roald Dahl – what changes occur when George makes the medicine – how do we know? Can they be reversed? <p><u>Scenarios</u></p> <ul style="list-style-type: none">• Katrina has spilt a lot of salt into the water. David says she can’t get the clean water back. (Observing over time)