

Year 5– Properties and changes of materials	Main Outcomes: <ul style="list-style-type: none"> • 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. 	Focus: Science – chemistry and physics
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What should I already know? <ul style="list-style-type: none"> • The identities, names and simple physical properties of a variety of everyday materials, including wood, plastic, glass, metal, water, brick, rock, paper and cardboard. • How the properties of these materials can be used to compare and group them, as well as to identify their suitability for particular uses.
What I will do <p>I will have weekly or blocked science lessons. In lessons, I will be taught a skill and I will gain knowledge and understanding through the process of scientific enquiry (observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources).</p> <p><u>Possible lines of enquiry</u></p> <ul style="list-style-type: none"> • Explore and compare the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. • Explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. • Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. • Find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.
Resources <p>Hamilton Science planning: properties of materials and changes of materials</p> <p>https://www.hamilton-trust.org.uk/science/year-5-science/properties-materials-music-festival-materials/ https://www.hamilton-trust.org.uk/science/year-5-science/changes-materials-changing-materials-education-pack/</p> <p>(all planning also saved on SharePoint).</p>

Vocabulary	Meaning
absorbent	soaks up liquid easily
accuracy	the closeness of the measured value to a standard or true value
bar chart	displays information (data) by using rectangular bars of different heights
burning	an irreversible chemical reaction that produces heat and light (also known as combustion)
causal relationship	when one thing is responsible for causing the other thing
conductor	a material that electricity or heat can pass through
dissolve	the process whereby a substance (solute) mixes with a solvent to form a solution
enquiry	a process or design used to gather information in the hope of gaining an answer of some sort
evaporation	the process by which a liquid turns into a gas as a result of increased energy in its particles
filter/filtering/sieve/sieving	removing small particles of insoluble or undissolved material from a liquid , usually by using a barrier with very small holes such as filter paper
gas	particles with no fixed shape or volume
hard-wearing (durable)	strong; lasts for a long time
insoluble	unable to be dissolved in a solvent
insulator	a material that electricity or heat cannot pass through
irreversible	when materials cannot be changed back to how they were before the reaction took place
line graphs	plotted on a graph as a series of points joined with straight lines
liquid	particles whose shape does change, it is not rigid
magnet	a rock or a piece of metal that can pull (attract) certain types of metal toward itself
mixture	a physical combination of two or more substances that aren't chemically joined (e.g. rice in water)
oxidation	when a substance reacts and combines with oxygen, e.g. iron + oxygen → iron oxide (rust)
precision	how precise or exact something is
property	a quality of a material, e.g. 'hard' or 'shiny'
reaction	a process in which one or more substances are converted to one or more different substances
reversible	when materials can be changed back to how they were before the reaction took place
scatter graph	a diagram which compares two sets of data
solid	particles whose shape does not change on their own – it is rigid
soluble	able to be dissolved in a solvent
solute	a substance which mixes (dissolves) with a solvent to form a solution
solution	a mixture of two or more substances (solutes) that stay evenly mixed (dissolved)
sound-proof	to block sound waves
support/refute	to prove right (support) or wrong (refute) by argument or evidence
variable	any one of the elements of the test which could be changed

Knowledge and Skills Map – Science at Estcots School

Knowledge to understand		Skills to learn
Different materials have different properties which affect what we use them for.	<ul style="list-style-type: none"> • Hard materials are difficult to scratch or bend. • Materials that aren't hard are soft. • Transparent materials are see-through. • Opaque materials are not see-through. • Insoluble materials don't dissolve. • Soluble materials dissolve. • Thermal insulators don't let much heat pass through them. • Thermal conductors let heat pass through them easily. • Electrical insulators don't let much electricity pass through them. • Electrical conductors let electricity pass (flow) through them easily. • Magnetic materials can be attracted to magnets. • Non-magnetic materials cannot be attracted to magnets. 	<ul style="list-style-type: none"> ➤ planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ➤ taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate ➤ recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs ➤ using test results to make predictions to set up further comparative and fair tests ➤ reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ➤ identifying scientific evidence that has been used to support or refute ideas or arguments
Some solids dissolve in liquids to form a solution .	When a solid (solute) dissolves in a liquid (solvent) , you can't see it anymore; it has formed a solution .	Cross-curricular (maths) <ul style="list-style-type: none"> ➤ statistics: interpret and present data using bar charts, pictograms and tables
A mixture is just things mixed together.	Examples include rice, sand or tea leaves in water.	Equipment/Procedures to become familiar with
Mixtures can be separated. The separation method depends on the mixture.	Sieve to separate a solid mixed with another solid . Filter to separate solids from liquids . Evaporate to separate dissolved solids from liquids e.g. salt or sugar in water.	Cameras Thermometers Digital scales Measuring jugs Sticky-note investigations Data loggers Sieves/cotanders Filters Magnets
Changes can be reversible or irreversible .	After a reversible change, the material looks and feels different, but it can change back to how it was before the change e.g. ice ⇌ water.	

Evidence of Learning	How will I know what I've learnt?
Science books Photos Videos Pupil conferencing Teaching and learning observations Learning walks Data analysis	See KS2 teacher assessment exemplification for science https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763065/2018_key_stage_2_teacher_assessment_exemplification_science.pdf See also Hamilton Science_Assessment_Y5 (saved in planning folder on Sharepoint). KS2 quizzes: https://gcequiz.com/quiz/ks2-science-quizzes https://churchfieldsjunior.com/test-your-skills-science/