

Science Project Overview Year 5 Materials

<p>Subject Knowledge (PoS) Substantive Knowledge</p> <ul style="list-style-type: none"> Materials can be grouped according to their properties including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. some materials will dissolve in liquid to form a solution a substance can be recovered from a solution by evaporation mixtures can be separated, through filtering, sieving and evaporating. Solids have a fixed shape and fixed volume, which means they don't move to fill a container when they're placed in it. They hold their own shape and volume Liquids are a material whose particles have gaps between them and moderate energy. A liquid takes the shape of the container it is in; it will flow but can be contained relatively easily A gas is a substance made up of high energy particles that are constantly moving rapidly. The particles are not in a fixed structure and are not close together either - they are spaced out and always moving. Gases have no fixed shape. They can flow, take the shape of a container and even be squashed too. materials, including metals, wood and plastic have different uses depending on their properties. dissolving, mixing and changes of state are reversible changes. 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. 	<p>Working Scientifically (PoS+Overview) Disciplinary Knowledge During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> Asking their own questions about scientific phenomena Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources. 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. Draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings 	<p>Working Scientifically Methods Using different types of scientific enquiry to answer their own questions, including:</p> <ul style="list-style-type: none"> observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources.
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<p>Previous learning:</p> <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. (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) 	<p>Preparing for learning:</p> <ul style="list-style-type: none"> 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) 	<p>Bespoke to our learning:</p> <p>Children are taught the tier 2 and 3 vocabulary. Children will retrieve knowledge and vocabulary taught in Year 4 on the states of matter.</p>
<p>Vocabulary:</p> <p>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material properties, hardness, solubility, transparency, electrical conductivity, thermal conductivity, magnetism, dissolve, substance, separating, mixing, filtering, sieving, burning, reactions, irreversible change</p>		
<p>Misconceptions:</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 		
<p>English Links:</p> <p>The BFG,</p>		

George's marvellous medicine

Maths links:

Measurement: Use practical resources to estimate volume and capacity- when doing investigations

Statistics : Use line graphs to solve comparison, sum and difference problems- compare differences in temperatures with insulators/ conductors etc
Identify the necessary information in tables (including timetables) and be able to complete them

Famous Scientists to possibly study:

Jamie Garcia (BP website)- Invention of a new plastic <http://bpes.bp.com/primary-resources/science/ages-9-to-11/properties-and-changes-of-materials/super-scientists-jamie-garcia/>

Royal Society of Chemistry – 'The 175 Faces of Chemistry' provides information on contemporary chemists and chemists of the past - <http://www.rsc.org/diversity/175-faces/all-faces>

Explorify links:

[Brilliantly bouncy egg](#)

[Shaking sensation](#)

[Melting ice cubes](#)

[Electrifying metals](#)

[Interesting insulators](#)

Possible careers/jobs:

Biochemist (investigates chemical processes that take place inside living things), Builder (builds structures) , Chemical engineer (solves problems involving chemicals) , Chemist (studies chemistry.), Geologist (studies the Earth and what it is made of, including rocks) , Materials scientist (researches structures and properties of materials) , Mechanical engineer (designs, analyses and manufactures mechanical systems)