



Science – The properties of and changes of materials (Year 5)

Outcome: Create ice cream

Chemistry



Prior Knowledge and Skills

- 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)

Ideas and inspiration:

Spencer Silver & Arthur Fry (Chemical Engineer & Chemist respectively who invented the post-it note).



Andre Geim & Konstantin Novoselov (Physicists who discovered graphene – the thinnest material known to man, and also incredible strong – about 200 times stronger than steel!)

Jamie Garcia (Chemist who discovered a fully recyclable plastic).



Raquel Prado (Chemist who develops a sustainable fabric that looks like leather but comes from pineapple leaves that would otherwise be burnt).

Enquiries

Identifying, grouping and classifying
- Based on the children's own criteria, classify the materials themselves e.g. samples of wood, metal, plastic, etc.
- After observing what happens when solids are added to liquids, classify materials based on the outcomes.



Observing over time
- Observe rusting with uncoated nails in different liquids. (This can be achieved by removing coating with sandpaper.)



Comparative/ fair testing
- Which material would be good for a tent?
- Which material would be good to make a tea bag from?
- Which materials keep things warm/cold?
- Which material would be good for a bag for different purposes?
- Test solids for solubility.
- Compare rates of solubility.
- Burn different materials (not plastic or toxic substances).



Vocabulary:

Properties of materials:

thermal conductor/insulator, magnetism, electrical resistance, transparency.

Mixtures and solutions:

dissolving, substance, soluble, insoluble.

Changes of materials:

reversible change, physical change, irreversible change, chemical change, burning, new material, product.





















Separating:

sieving, filtering, magnetic attraction.

Previously introduced vocabulary:

electrical conductor/insulator, bulb, translucent.

Developing Knowledge and Skills

Scientific Knowledge:		Working Towards	Within	Expected	Above
	 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.				
Working Scientifically (Skills): Plan:		Working Towards	Within	Expected	Above
 	 Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.				
Working Scientifically (Skills): Do:		Working Towards	Within	Expected	Above
 	 Take measurements, using a range of scientific equipment, with increasing accuracy and precision, take repeat readings when appropriate.				
Working Scientifically (Skills): Record:		Working Towards	Within	Expected	Above
 	 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.				
Working Scientifically (Skills): Review:		Working Towards	Within	Expected	Above
  	 Use test results to make predictions to set up further comparative and fair tests.				
	 Report and present 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.				

How did you use your learning from Years 3 and 4 during this topic? _____

Is there anything else you would like to know about properties? _____

Highlights: _____
