DOWN AMPNEY PRIMARY SCHOOL

Term 1
Unit Overview: UKS2 Science
Properties and Changes of Materials

National Curriculum 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.

Working Scientifically Skills

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Substantive knowledge

- Know that Materials have different uses depending on their properties and state (liquid, solid, gas).
- Know that properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets.
  Know that some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.
- Explore how mixtures can be separated by filtering, sieving and evaporation.
- Observe that some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.

Disciplinary knowledge

- Create a chart or table grouping/comparing everyday materials by different properties.
- Use test evidence gathered about different properties to suggest an appropriate material for a particular purpose.
- Group solids based on their observations when mixing them with water.
- Give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water.
- Explain the results from their investigations.

Vocabulary

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, solute, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

Phonics / polysyllabic words

suspen**sion** / suspend
filtra**tion** / filter
reversi**ble**
insulat**or**
conduct**or**

Reading support

- Word mats
- Scaffolded recording / choice of recording
- Pre teaching of vocab

Extension deeper thinking

- What if…there was no plastic? Can bio plastics be produced easily?
- What if…we didn't have access to clean drinking water? 'How can you get drinking water from salty water?' What global solutions to filter water exist?
- Explore combining two materials to achieve desired properties, for example, looking at layers in clothing for harsh conditions/sports clothing.
- Carry out further fair tests involving dissolving, properties of materials and evaporation.
- Research ways to prevent cars rusting.
- Research smart materials and invent uses for smart materials.

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❖ Report and present findings from enquiries, including conclusions and explanations of degree of trust in results.
❖ Use test results to make predictions to set up further comparative and fair tests.

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British Values
❖ Democracy Take the views and opinions of others into account. Take turns and instructions from others.
❖ The rule of law Understand the importance of safety rules when working scientifically make choices when planning an investigation as others may have different points of view as to where to start.
❖ Tolerance Scientific discoveries have come from other cultures and religious beliefs often compete with scientific understanding.
❖ Mutual respect Work as a team, discuss findings and 0ffer support and advice to others.

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Key People
❖ Gunay Shamilova Corrosion Engineer
❖ Becky Schroeder (Inventor of the glow sheet)

Christian Values
Courage
❖ Ask our own questions to support our own understanding of the world and understand that sharing ideas, data, and results (for further testing and development by others) is a key principle of the scientific method.

Respect
❖ Supporting other's ideas, even if they differ to our own.
❖ Explore and celebrate research and developments that take place in many different cultures, both past and present.
❖ Explore how scientific discoveries have shaped the beliefs, cultures and politics of the modern world.

Trust
❖ Celebrate everyone's unique ideas and working together collaboratively.

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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

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Possible misconceptions
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
❖ lit candles only melt, which is a reversible change.

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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)