Caroline Haslett Primary: Spring term Properties & Changes of Materials Y5

Vocabulary	
circuit	a complete route which an electric current can flow around
condensation	small drops of water which form when water vapour or steam touches a cold surface, such as a window
conductor	a substance that heat or electricity can pass through or along
dissolves	when a substance is mixed with a liquid and the substance disappears
electricity	a form of energy that can be carried by wires and in used for heating and lighting, and to provide power for devices
evaporation	to turn from liquid into gas; pass away in the form of vapour.
filtering	a device used to remove dirt or other **solids** from **liquids** or **gases**. A filter can be made of paper, charcoal, or other material with tiny holes in it.
flexible	an object or material can be bent easily without breaking
gas	a form of matter that is neither **liquid** nor **solid**. A **gas** rapidly spreads out when it is warmed and contracts when it is cooled.
insoluble	impossible to **dissolve**, esp. in a given **liquid**.
insulator	a non-conductor of electricity or heat
irreversible	impossible to reverse, turn back, or change.
liquid	in a form that flows easily and is neither a **solid** nor a **gas**.
magnetic	having to do with magnets and the way they work
melting	to change from a **solid** to a **liquid** state through heat or pressure
particles	a tiny amount or small piece
permeable	of a substance, being such that **gas** or **liquid** can pass through it
process	a series of actions used to produce something or reach a goal.
properties	the ways in which an object behaves
rate	the speed with which something happens
resistance	the opposing power of one force against another.
reversible	able to turn or change back
solid	having a firm shape or form that can be measured in length, width, and height; not like a **liquid** or a **gas**
soluble	able to be **dissolved**.
solution	a mixture that contains two or more substances combined evenly
state	the structure or condition of something
temperature	a measure of how hot or cold something is
thermal	relating to or caused by heat or by changes in **temperature**
transparent	If an object is **transparent**, you can see through it
variable	something that can change or that has no fixed value
water cycle	the process by which water on the earth evaporates, then condenses in the atmosphere, and then returns to earth in the form of precipitation.

What should I already know?

- A variety of everyday materials including wood, plastic, glass, metal, water and rock.
- The physical **properties** of a variety of everyday **materials** (including those that are **transparent**) and to compare and group **materials** on the basis of these **properties**
- How materials are suitably used based on their **properties**.
- How **magnets** and **electrical circuits** work.
- Some materials which are **magnetic.**
- How shapes of solid objects can be changed by squashing, bending, twisting and stretching.
- **Materials** that are **solids, liquids** and **gases** and their **particle** structure.
- Some **materials** change **state** when they are heated or cooled and the **temperature** at which this happens.
- The roles of **melting, evaporation** and **condensation** in the **water cycle** and the role **temperature** has on the **rate** of **evaporation**.
- Some rocks are **permeable.**

What will I know by the end of the unit?

How to group materials based on their properties using more complex vocabulary.

What are thermal insulators and conductors?

- **Materials** which are good **thermal conductors** allow heat to move through them easily.
- **Thermal conductors** are used to make items that require heat to travel through them easily, such as a saucepan which requires heat to travel through to cook food.
- **Thermal insulators** do not let heat travel through them easily.
- Examples of **thermal insulators** include woollen clothes and flasks for hot drinks.

What are electrical insulators and conductors?

- **Electrical conductors** allow electricity to pass through them easily while **electrical insulators** do not.
- **Electrical insulators** have a high **resistance** which means that it is hard for electricity to pass through these objects.

What is dissolving?

- When the **particles** of a **solid** mix with the **particles** of a **liquid,** this is called **dissolving**.
- The result is a **solution.**
- **Materials** that **dissolve** are **soluble**.
- **Materials** that do not **dissolve** are **insoluble**.

Can materials be separated after they have been mixed?

- Some **materials** can be separated after they have been mixed based on their **properties** - this is called a **reversible** change.
- Some methods of separation include the use of a magnet, a **filter** (for insoluble materials), a sieve (based on the size of the solids) and **evaporation.**
- When a mixture cannot be separated back into the original components, this is called an **irreversible** change. Examples of this include when materials burn or mixing bicarbonate of soda with vinegar.

Investigate!

- Find the best material to stop an ice cube from melting. Remember to keep it a fair test by using the same number of ice cubes, or same size and thickness material.
- Place the same amount of a hot liquid in a **thermal insulator** and **conductor**. Measure the temperature over time and plot these on the same line graph. Use the line graph to ask and answer questions.
- Find out if **thermal conductors** also make good **electrical conductors.**
- Explain the difference between **dissolving** and **melting.**
- Investigate which **materials** are **soluble** and **insoluble.**
- Design an experiment that investigates **dissolving** - consider which **variables** you could change including: size of beaker, amount of **liquid**, number of stirs, size of **solid**, **temperature** of **solid** (remember that for a fair test all other **variables** must remain the same).
- Create a variety of mixtures using materials such as salt, sand, water, paper clips and rice and use a variety of methods to separate them.
- Observe and compare the changes that take place when cakes are baked or bicarbonate of soda mixes with vinegar.

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Working scientifically	The results are information, such as measurements or observations, that have been collected during an investigation. A conclusion is an explanation of what has been discovered using evidence collected. Use relevant scientific vocabulary to report on their findings. Answer questions and justify their conclusions based on evidence collected. Identify improvements, further questions and predictions. Questions can help us find out about the world and can be answered using a range of scientific enquiries. Ask a wide range of relevant scientific questions that broaden their understanding of the world around them and identify how they can answer them. A method is a set of clear instructions for how to carry out a scientific investigation. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding. Plan and carry out a range of enquiries, including writing methods, identifying variables and making predictions based on prior knowledge and understanding. Specialised equipment is used to take measurements in standard units eg. data loggers plus sensors, such as light (lux), sound (dB) and temperature (°C); timers (seconds, minutes and hours); thermometers (°C), and measuring tapes (millimetres, centimetres, metres). Take increasingly accurate measurements, in standard units, using a range of chosen equipment. An observation involves looking closely at objects, materials and living things. Accurate observations can be made repeatedly or at regular intervals to identify changes over time. Within a group, decide which observations to make, when and for how long, and make systematic and careful observations. Use them to make comparisons, identify changes, classify and make links between cause and effect. Data can be recorded and displayed in different ways, including tables, bar and line charts, classification keys and labelled diagrams. Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models). The results are information, such as measurements or observations, that have been collected during an investigation. A conclusion is an explanation of what has been discovered using evidence collected. Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected. Identify improvements, further questions and predictions.
Materials	Materials can be grouped according to their basic physical properties. Properties include hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Compare and group everyday materials by their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Some materials (solutes) will dissolve in liquid (solvents) to form a solution. The solute can be recovered by evaporating off the solvent by heating. Explain, following observation, that some substances (solutes) will dissolve in liquid (solvents) to form a solution and the solute can be recovered by evaporating off the solvent. Some mixtures can be separated by filtering, sieving and evaporating. Sieving can be used to separate large solids from liquids and some solids from other solids. Filtering can be used to separate small solids from liquids.

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	Evaporating can be used to separate dissolved solids from liquids. Separate mixtures by filtering, sieving and evaporating. A material's properties dictate what it can be used for eg. cooking pans are made from metal, which is a good thermal conductor, allowing heat to quickly transfer from the hob to the contents of the pan. Describe, using evidence from comparative or fair tests, why a material has been chosen for a specific use. Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions. Identify, demonstrate and compare reversible and irreversible changes.