













**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 <b>materials</b> based on their <b>properties</b> using more complex vocabulary. |  magnetic  transparent  flexible  |
| What are <b>thermal insulators</b> and <b>conductors</b> ?                                    |  permeable  soluble  insoluble  |
| What are <b>electrical insulators</b> and <b>conductors</b> ?                                 | <ul style="list-style-type: none"> <li>• <b>Materials</b> which are good <b>thermal conductors</b> allow heat to move through them easily.</li> <li>• <b>Thermal conductors</b> 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.</li> <li>• <b>Thermal insulators</b> do not let heat travel through them easily.</li> <li>• Examples of <b>thermal insulators</b> include woollen clothes and flasks for hot drinks.</li> </ul>  thermal insulator  thermal conductor                                       |
| What is <b>dissolving</b> ?   | <ul style="list-style-type: none"> <li>• When the <b>particles</b> of a <b>solid</b> mix with the <b>particles</b> of a <b>liquid</b>, this is called <b>dissolving</b>.</li> <li>• The result is a <b>solution</b>.</li> <li>• <b>Materials</b> that <b>dissolve</b> are <b>soluble</b>.</li> <li>• <b>Materials</b> that do not <b>dissolve</b> are <b>insoluble</b>.</li> </ul>  dissolving  solution  soluble  insoluble |
| Can <b>materials</b> be separated after they have been mixed?                                 | <ul style="list-style-type: none"> <li>• Some <b>materials</b> can be separated after they have been mixed based on their <b>properties</b> - this is called a <b>reversible</b> change.</li> <li>• Some methods of separation include the use of a magnet, a <b>filter</b> (for insoluble materials), a sieve (based on the size of the solids) and <b>evaporation</b>.</li> <li>• When a mixture cannot be separated back into the original components, this is called an <b>irreversible</b> change. Examples of this include when materials burn or mixing bicarbonate of soda with vinegar.</li> </ul>  |

**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 is 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 <b>solids</b> from <b>liquids</b> or <b>gases</b> . 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 <b>liquid</b> nor <b>solid</b> . A <b>gas</b> rapidly spreads out when it is warmed and contracts when it is cooled.                       |
| insoluble    | impossible to <b>dissolve</b> , esp. in a given <b>liquid</b> .   |
| 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 <b>solid</b> nor a <b>gas</b> .  |
| magnetic     | having to do with magnets and the way they work   |
| melting      | to change from a <b>solid</b> to a <b>liquid</b> state through heat or pressure   |
| particles    | a tiny amount or small piece  |
| permeable    | of a substance, being such that <b>gas</b> or <b>liquid</b> 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 <b>liquid</b> or a <b>gas</b>   |
| soluble      | able to be <b>dissolved</b> .   |
| 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 <b>temperature</b>   |
| transparent  | If an object is <b>transparent</b> , 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.                               |

**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.

|   |                |                          |
|---|----------------|--------------------------|
| <b>Topic: Properties and changes of materials</b> | <b>Year: 5</b> | <b>Strand: Chemistry</b> |
|---|----------------|--------------------------|

|   |                |              |
|---|----------------|--------------|
| Question 1: Thermal insulators...(tick two)         | Start of unit: | End of unit: |
| do not allow heat to pass through easily            |                |              |
| allow heat to pass through easily                   |                |              |
| keep heat contained and keep things warm            |                |              |
| do not keep heat contained and allow things to cool |                |              |

|  |                |              |
|--|----------------|--------------|
| Q2: Examples of electrical conductors are....(tick all that apply) | Start of unit: | End of unit: |
| copper   |                |              |
| plastic  |                |              |
| wood   |                |              |
| iron   |                |              |
| rubber   |                |              |

|  |                |              |
|--|----------------|--------------|
| Question 3: Materials that dissolve are: | Start of unit: | End of unit: |
| insoluble                                |                |              |
| soluble                                  |                |              |
| a solution                               |                |              |

|  |                |              |
|--|----------------|--------------|
| Question 4: When solid particles mix with the particles of a liquid, this is called... | Start of unit: | End of unit: |
| evaporation  |                |              |
| filtering  |                |              |
| dissolving   |                |              |
| sieving  |                |              |

|  |                |              |
|--|----------------|--------------|
| Question 5: A synonym for the word 'permeable' is... | Start of unit: | End of unit: |
| waterproof   |                |              |
| absorbent  |                |              |
| magnetic   |                |              |
| transparent  |                |              |

|   |                    |              |              |                             |  |             |                             |  |         |  |  |
|---|--------------------|--------------|--------------|-----------------------------|--|-------------|-----------------------------|--|---------|--|--|
| Question 6: Match these changes to the scientific name for the process.   | Start of unit:     | End of unit: |              |                             |  |             |                             |  |         |  |  |
| <table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 40%;">ice turns to water</td> <td style="border: 1px solid black; padding: 5px; width: 20%;"></td> <td style="border: 1px solid black; padding: 5px; width: 40%;">condensation</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">water turns to water vapour</td> <td style="border: 1px solid black; padding: 5px;"></td> <td style="border: 1px solid black; padding: 5px;">evaporation</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">water vapour turns to water</td> <td style="border: 1px solid black; padding: 5px;"></td> <td style="border: 1px solid black; padding: 5px;">melting</td> </tr> </table> | ice turns to water |              | condensation | water turns to water vapour |  | evaporation | water vapour turns to water |  | melting |  |  |
| ice turns to water  |                    | condensation |              |                             |  |             |                             |  |         |  |  |
| water turns to water vapour   |                    | evaporation  |              |                             |  |             |                             |  |         |  |  |
| water vapour turns to water   |                    | melting      |              |                             |  |             |                             |  |         |  |  |

|  |                |              |
|--|----------------|--------------|
| Question 7: Describe an efficient way of separating paper clips from rice and explain why you chose this method. | Start of unit: | End of unit: |
|  |                |              |

|   |                |              |
|---|----------------|--------------|
| Question 8: You conduct an experiment to investigate if some solids dissolve quicker than others. Name one thing you will do to make the test fair. | Start of unit: | End of unit: |
|   |                |              |

|   |                |              |           |                |  |         |                |  |             |  |  |
|---|----------------|--------------|-----------|----------------|--|---------|----------------|--|-------------|--|--|
| Question 9: Match these mixtures to the most efficient methods of separation.   | Start of unit: | End of unit: |           |                |  |         |                |  |             |  |  |
| <table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 30%;">salt and water</td> <td style="width: 40%;"></td> <td style="border: 1px solid black; padding: 5px; width: 30%;">filtering</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">rice and water</td> <td></td> <td style="border: 1px solid black; padding: 5px;">sieving</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">sand and water</td> <td></td> <td style="border: 1px solid black; padding: 5px;">evaporating</td> </tr> </table> | salt and water |              | filtering | rice and water |  | sieving | sand and water |  | evaporating |  |  |
| salt and water  |                | filtering    |           |                |  |         |                |  |             |  |  |
| rice and water  |                | sieving      |           |                |  |         |                |  |             |  |  |
| sand and water  |                | evaporating  |           |                |  |         |                |  |             |  |  |

|  |                |              |
|--|----------------|--------------|
| Question 10: Write an 'R' or an 'I' to indicate if these are examples of reversible or irreversible changes. | Start of unit: | End of unit: |
| frying an egg  |                |              |
| mixing paper clips and sand  |                |              |
| mixing sugar and water   |                |              |
| baking a cake  |                |              |
| mixing flour and water   |                |              |
| mixing coins and flour   |                |              |
| mixing bicarbonate of soda and vinegar   |                |              |
| mixing oil and water   |                |              |