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| **Topic-States of matter** | | | Year 4 | | | | | | | | | Strand - Chemistry | | | | | | |
| What should I already Know? | | | | | What will I know at the end of the unit? | | | | | | | | | | | | | |
| * Why some materials are used for certain purposes because of their **properties** * The **water cycle,** and the **processes** of **evaporation, condensation** and **precipitation.** | | | | | What is a  **particle?** | | | | | | * **Particles** are what materials are made from. * They are so small that we cannot see them with our eyes. * The **properties** of a substance depend on what its particles are like, how they move and how they are arranged * Particles behave differently in solids, liquids and **gases.** | | | | | | | |
| |  |  | | --- | --- | | condensation | small drops of water which form when **water vapour** or steam  touches a cold **surface**, such as a window | | cooling | lowering the **temperature** of something | | evaporation | to turn from liquid into gas; pass away in the form of **vapour**. | | freezing | If a **liquid** or a substance containing a **liquid freezes**, it becomes **solid** because of low **temperatures** | | freezing point | The **freezing point** of a particular substance is the **temperature** at which it **freezes**. The **freezing point** of water is 0oC. | | 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**. | | heating | raising the **temperature** of something | | liquid | in a form that flows easily and is neither a **solid** nor a **gas**. | | melting | to change from a **solid** to a **liquid** state through heat or pressure | | melting point | The **melting point** of a particular substance is the **temperature** at which it **melts**. | | particles | a tiny amount or small piece | | precipitation | rain, snow, sleet, dew, etc, formed by **condensation** of **water vapour** in the atmosphere | | process | a series of actions used to produce something or reach a goal. | | properties | the ways in which an object behaves | | solid | having a firm shape or form that can be measured in length, width, and height; not like a **liquid** or **gas** | | temperature | a measure of how hot or cold something is | | vibrations | when something **vibrates,** it shakes with repeated small, quick movements | | 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**. | | Water vapour | Water in the gaseous state, esp when due to evaporation at a temperature below the boiling point. | | | | | | What is a  **solid?** | | | | | | * In the **solid** state, the material holds its shape. * **Solids** have **vibrating particles** which are closely packed in and form a regular pattern. * This explains the fixed shape of a solid and why it can’t be poured. * **Solids** always take up the same amount space. | | | | | | | |
| What is a  **liquid?** | | | | | | * In the **liquid** state, the material holds the shape of the container it is in. * This means that **liquids** can change shape, depending on the container. * **Liquids** have **particles** which are close together but random. * **Liquid particles** can move over each other. * **Liquids** can be poured. | | | | | | | |
| What is a  **gas?** | | | | | | * In the **gas** state, **particles** can escape from open containers. * **Gases** have **particles** which are spread out and move in all directions. | | | | | | | |
| What happens to the **particles** in water  when it is **heated** or **cooled**? | | | | | | * When water (in its **liquid** form) is **heated**, the particles start to move faster and faster until they have enough energy to move about more freely. The water has **evaporated** into a **water vapour.** * When water is **cooled**, the particles start to slow down until a solid structure (ice) is formed. The water has **frozen.** * The **temperature** at which water turns to ice is called the **freezing point.** This happens at 0oC. | | | | | | | |
| Diagram | | | | | What is the  **water cycle?**  (see separate knowledge organiser Geography - The Water Cycle) | | | | | |  | | | | | | | |
| **Investigate** | | | | | | | | | | | | | | | | | | |
| * Group materials according to their states. * Explain the **particle** structure of **solids, liquids** and **gases.** * Explore the effect of **temperature** on substances such as chocolate, butter, cream. Compare their **melting points** and place them in a table. * Research the **temperature** at which materials change state, for example, when iron **melts** or when oxygen **condenses** into a **liquid**. * Observe and record **evaporation** over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of   **temperature** on washing drying or snowmen melting.   * Analyse and interpret different forms of data (tables, graphs) to show the effects of **temperature** on states of matter. * Present what you know about the water cycle using a variety of skills using appropriate vocabulary (The Water Cycle Knowledge Organiser). * Observe **evaporation** and **condensation** in action by using bowls of water and mirrors /glass (The Water Cycle Knowledge Organiser). | | | | | | | | | | | | | | | | | | |
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| **Topic-States of matter** | | **Year 4** | | | | | | | | | | | **Strand - Chemistry** | | | | | |
|  | | | | | | | | | | | | | | | | | | |
| Question 1: The particles in a solid: | Start of  unit: | | | End of  unit: |  | | | Question 6: Name the process that  describes the change from water to ice. | | | | | | | Start of unit: | | End of unit: | |
| are closely packed together and  vibrate |  | | |  |  | | | | | | | | | | |
| move freely over each other within a container in which they are held |  | | |  |
| can be poured |  | | |  |
| are very spread out and can escape an open container |  | | |  | Question 7: Write solid, liquid or gas to label each part of the diagram. | | | | | | Start of unit: | | | End of unit: | |
|  | | | | |  | | | | | |  | | |  | |
| Question 2: The particles in a liquid (tick two): | Start of  unit: | | | End of  unit: |
| are closely packed together and  vibrate |  | | |  |
| move freely over each other within a container in which they are held |  | | |  |
| can be poured |  | | |  |
| are very spread out and can escape an open container |  | | |  |
|  | | | | | | | | | | | | | | | | | | |
| Question 3: The particles in a gas: | Start of  unit: | | | End of  unit: | |  | | | Question 8: Match these changes to the  scientific name for the process. | | | | | | | Start of  unit: | | End of  unit: |
| are closely packed together and  vibrate |  | | |  | |  | | | | | | |  | |  |
| move freely over each other within a  container in which they are held |  | | |  | |
| can be poured |  | | |  | |
| are very spread out and can escape  an open container |  | | |  | |
|  | | | | | | | | | | | | | | | | | | |
| Question 4: Match the states to their particle structure: | Start of unit: | | | End of  unit: | |  | | | Question 9: Solids, liquids and gases have different properties. Indicate using an S, L or G, which state these properties apply to. | | | | | | | Start of unit | | End of unit: |
|  |  | | |  | | keeps its own shape | | | | | | |  | |  |
|  | | |  | | can be poured | | | | | | | : | |  |
|  | | |  | | flows easily through a pipe | | | | | | |  | |  |
|  | | |  | | takes the shape of the container it is in | | | | | | |  | |  |
|  | | |  | | Can escape from an open container | | | | | | |  | |  |
|  | | | | | | | | | | | | | | | | | | |
| Question 5: What is the freezing  point of water? | Start of  unit: | | | End of  unit: | | | . | | | Question 10: Explain why puddles get smaller after it has rained | | | | | | Start of unit: | | End of unit: |
|  |  | | |  | | |  | | | | | |  | |  |