

Changes of State

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

50 g of ice melts in a beaker. What is the mass of the water?

Step 1 · Conservation of mass

In a change of state no particles are created or destroyed; they just rearrange.

Step 2 · So

The water has a mass of 50 g.

Answer: 50 g

Check: Changes of state are physical changes: no new substance is made.

2. Now try one with the steps

Why does the temperature stay at 0 °C while ice is melting?

Step 1 · Energy still going in

Step 2 · Where it goes

Step 3 · Result

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the name for a solid turning into a liquid? [1]

2. What is the name for a gas turning into a liquid? [1]

3. At what temperature does pure ice melt, in °C? [1]

4. At what temperature does pure water boil at sea level, in °C? [1]

5. 50 g of ice melts completely. What is the mass of the water, in grams? [1]
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6. A beaker containing ice has a total mass of 180 g. The ice melts. What is the total mass now, in grams? [1]
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7. Explain why the temperature of melting ice stays at 0 °C even though it is being heated. [2]
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8. What is the difference between evaporation and boiling? [2]
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9. Why do puddles dry more quickly on a warm, windy day? [2]
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10. Is melting a physical or chemical change? Explain. [2]
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11. An open pan holds 500 g of water. After boiling, it holds 420 g. What mass of water escaped, in grams? [1]
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12. Water expands when it freezes. Use this to explain why ice floats. [2]
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13. A substance melts at –39 °C and boils at 357 °C. What state is it in at 20 °C? [1]
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14. Describe what happens to the particles when a liquid boils. [2]
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4. Before you hand it in

"The mass goes down when water evaporates."

Mass is conserved; it may just have left an open container.

"The temperature keeps rising while ice melts."

The temperature stays at 0 °C until all the ice has melted.

"Particles melt or get bigger."

Their arrangement and movement change; the particles stay the same.