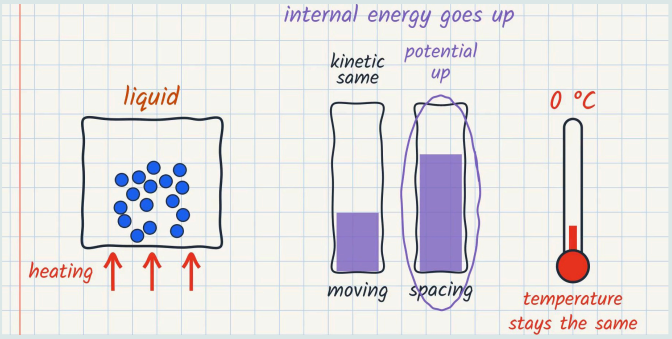
Specific latent heat

E = m L and heating graphs

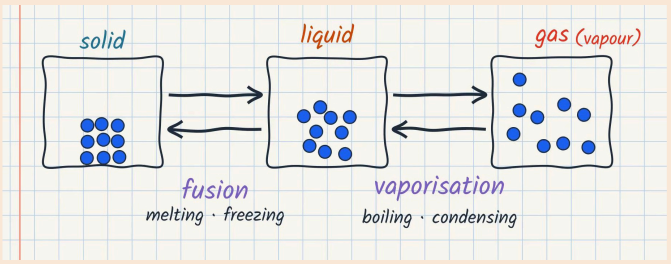
sansara academy
Summary sheet

1 Latent heat



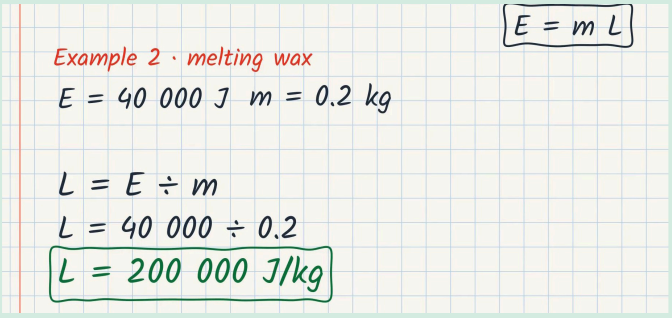
- **Latent heat** is the energy needed for a change of state.
- While a substance melts or boils, the energy pulls the particles apart: internal energy goes up, but the **temperature stays the same**.

2 Specific latent heat



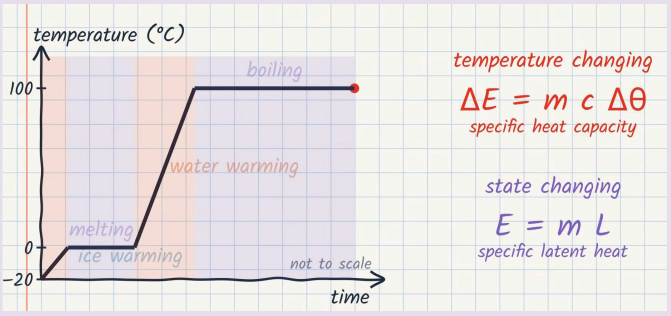
- **Specific latent heat** (L) is the energy needed to change the state of 1 kg of a substance, with no change in temperature.
- **Fusion**: melting or freezing. **Vaporisation**: boiling or condensing.

3 A worked example



- Ice: E = 0.2 × 334 000 = 66 800 J
- Wax: L = E ÷ m = 40 000 ÷ 0.2 = 200 000 J/kg

4 Heating graphs



- **Sloping parts**: temperature changing, use ΔE = m c Δθ.
- **Flat parts**: state changing, use E = m L. On a cooling graph the flat parts release energy.

E = m L

energy for a change of state = mass × specific latent heat

E	energy	joule (J)
m	mass	kilogram (kg)
L	specific latent heat	joules per kilogram (J/kg)

Rearrange: L = E ÷ m and m = E ÷ L

Exam tip

Both equations are on the sheet. Ask: is the temperature changing (ΔE = m c Δθ), or is the state changing (E = m L)?

Check yourself

- 1 How much energy boils away 0.1 kg of water? (L = 2 260 000 J/kg)
- 2 On a heating graph, what is happening on a flat section?

Answers: 1. E = 0.1 × 2 260 000 = 226 000 J 2. A change of state, at constant temperature.