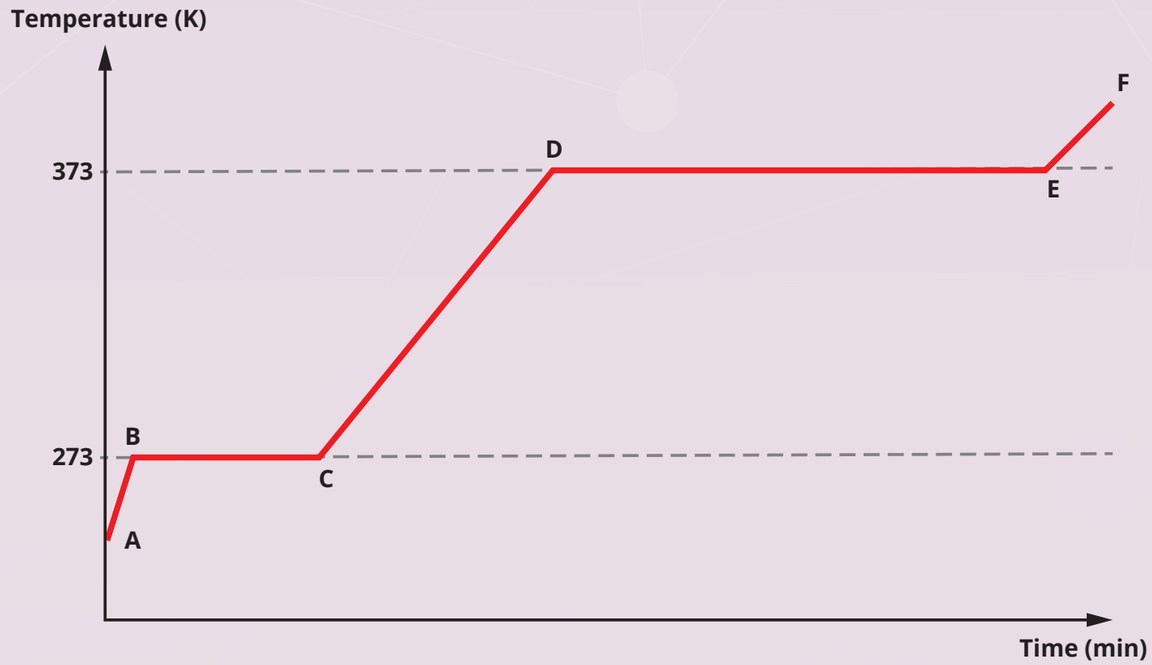
The graph below shows how the temperature of a block of ice changes over time as it is heated.



A-B	B-C	C-D	D-E	E-F
Solid	Melting	**Liquid**	Boiling	**Gas**
Particles are packed very closely. The **vibrate** in place but are **not free** to move.	Energy is used to break **some of the bonds** holding the particles in place.	Particles are close together but can **move** past each other.	Energy is used to break **all the bonds** holding the particles in place.	Particles are **free to move** and have large gaps between them.
As it is heated the particles vibrate more.	This energy is the **specific latent heat of fusion**.	As it is heated the particles move past each other more quickly.	This energy is the **specific latent heat of vaporisation**. It is larger than the latent heat of fusion because more bonds are broken when boiling.	As it is heated the particles move more quickly.

Specific heat capacity
This is the energy required to heat **1kg** of a substance by **1°C**.

For example, water has a specific heat capacity of 4200 J/kg °C, this means it would take 4200J of energy to heat 1kg of water by 1°C.

$$\Delta Q = mc\Delta\theta$$

Where:
ΔQ = change in thermal energy
m = mass
c = specific heat capacity
$\Delta\theta$ = change in temperature.

Specific latent heat
This is the energy required to **change the state** of **1kg** of a substance without a change in temperature.
For example, ice has a specific latent heat of fusion of 336000J/kg, this means it would take 336000J of energy to completely melt 1kg of ice into water without changing the temperature.

$$Q = mL$$

Where:
Q = thermal energy for change in state
m = mass
L = specific latent heat.