8.3 Heat Thermal capacity and latent heat

Thermal capacity

The **thermal capacity** of an object is the energy that must be supplied to the object to raise its temperature by 1°C.
It is measured in joules per degree Celsius (J/°C).

If the energy supplied (E) and the temperature changes from $\ominus_1$ to $\ominus_2$ then:

→Thermal capacity = $\frac{Energy\ supplied}{Temperature\ change}$

→ Thermal capacity = $\frac{E}{\Delta\ominus}$

For a temperature raise of 1°C, the heat equation becomes:
Heat received = mass x 1 x specific heat capacity
Thermal capacity = mass x specific heat capacity

Specific Heat Capacity

Specific heat capacity is the heat required to raise a 1kg mass of a substance by 1°C.
The symbol for specific heat capacity is "c".

If the mass (m) of a substance requires energy E for the temperature to rise from $\ominus_1$ to $\ominus_2$ then:

Energy supplied= mass x specific heat capacity x change in temperature
Q = m x c x $\Delta\ominus$

When a substance is heated, its temperature rise depends on the following:

1. Amount of energy supplied.
2. The mass of the substance: the greater the mass, the smaller the temperature rise.
3. The nature of the substance.

LATENT HEAT

Latent heat is the amount of heat required to change the state of the substance without temperature change.

Specific latent heat of fusion

This is the heat required to change 1kg of substance from solid to liquid without changing the temperature.

Specific latent heat of fusion:

$$L_f = \frac{Energy\ supplied}{Mass}$$

$$L_f = \frac{E}{M}$$

Its units are Joules per kilogram (J/kg).

Specific latent heat of vapourization

This is the energy needed to change 1kg of a substance from liquid to gas/vapor without temperature change.

Energy supplied= mass x specific latent heat of vapourization

$E = m \times L_V$

$$L_V = \frac{E}{m}$$

Its units are Joules per kilogram (J/kg).