

Energy to raise the temperature, melt, or boil a substance

Changing Temperature

Specific Heat Capacity, C

The specific heat capacity is the energy it takes to raise the temperature of a substance.

$$Q = mc\Delta T$$

Q = energy; m = mass, c = specific heat;
 ΔT = change in temp.

Kg or g? Cal or J?

The units you need to use for the mass and energy are dictated by the units provided by your specific heat table.

For example, if the specific heat table values are labelled J/g K, then energy must be in joules and mass in grams. (Temperature is always in degrees Kelvin.)

Melting / Freezing

Latent heat of fusion, L_f

The heat of fusion is the energy it takes to melt a substance (that is, convert it from solid to liquid).

$$Q = L_f \cdot m$$

Q_f = energy; m = mass; L_f = heat of fusion

Boiling / Condensing

Latent heat of fusion, L_v

The heat of vaporization is the energy it takes to boil a substance (that is, convert it from liquid to gas).

$$Q = L_v \cdot m$$

Q_v = energy; m = mass; L_v = heat of vaporization

Heat, Temperature, and Change of State

In the graph at right, the significant fact is that temperature does not change when a substance is changing from one state to another.

The energy being applied to the substance is going into changing the solid to a liquid or the liquid to a gas, rather than into changing the temperature.

