Heating Curve for Water
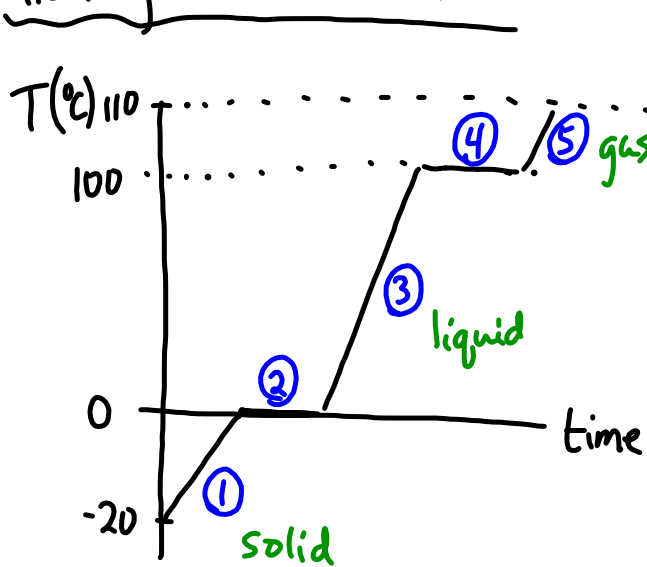
① heating ice (temp change)

② melting ice (phase change – no temp change)

③ heating water (temp change)

④ vapourizing water (phase chang. no temp change)

⑤ heating steam (temp change)

Temp Change: $Q = mc\Delta T$

Phase change: $Q = m\Delta H^{\circ}$

Using $Q = mc\Delta T$

Liquid water (50.0 g) is heated and its temperature is increased from 23.2°C to 48.9°C. How much heat was added?

$m = 50.0\ g$

$T_i = 23.2°C$

$T_f = 48.9°C$

$Q = ?$

$c = 4.18\ \dfrac{J}{g°C}$

5.37 kJ of heat was required

$Q = mc\Delta T$

$Q = (50.0\,g)\left(4.18\ \dfrac{J}{g°C}\right)\left(48.9°C - 23.2°C\right)$

$Q = (50.0\,g)\left(4.18\ \dfrac{J}{g°C}\right)\left(+25.7°C\right)$

$Q = +5371.3\ J$

$Q = +5.37 \times 10^3\ J$

$Q = \textcircled{+}\,5.37\ kJ$

↑ heat is required.

NOTE:
   If Q is +, heat is absorbed
   Q is −, heat is released