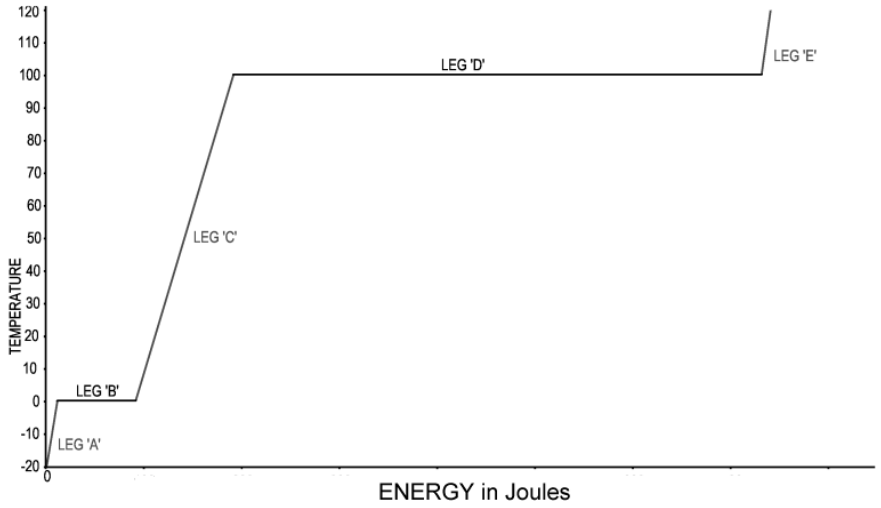
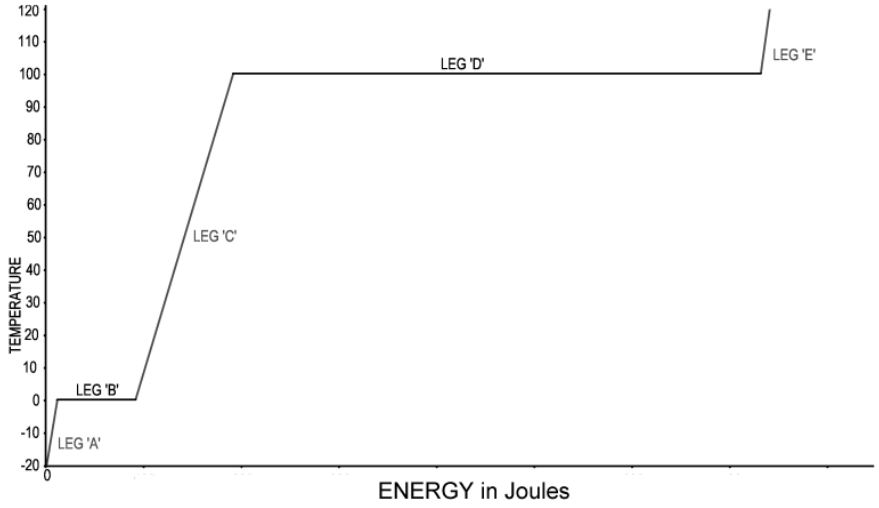
Heat of Phase Change

Heat of Fusion	Heat of Vaporization
The energy required to convert one gram of a substance from a solid to a liquid at its melting point. 1 gram $H_2O(s)$ + 334 J $\rightarrow$ 1 gram $H_2O(\ell)$ The energy released when one gram of a substance is converted from liquid to solid at its freezing point. 1 gram $H_2O(\ell) \rightarrow$ 1 gram $H_2O(s)$ + 334 J Equation: $Q = m\Delta H_{fus}$ $Q = heat\ in\ Joules$ $m = mass\ in\ grams$ $\Delta H_{fus} = 334\ Joule/gram$	The energy required to convert one gram of a substance from a liquid to a vapor at its boiling point. 1 gram $H_2O(\ell)$ + 2260 J $\rightarrow$ 1 gram $H_2O(g)$ The energy released when one gram of a substance condenses from a vapor to a liquid at its condensation point. 1 gram $H_2O(g) \rightarrow$ 1 gram $H_2O(\ell)$ + 2260 J Equation: $Q = m\Delta H_{vap}$ $Q = heat\ in\ Joules$ $m = mass\ in\ grams$ $\Delta H_{vap} = 2260\ Joule/gram$
 *Occurs along Leg "B"*	 *Occurs along Leg "D"*

Specific Heat

Specific Heat is the energy that must be added to raise the temperature of one gram of a substance by one Celsius degree

AND

Specific Heat is the energy that must be removed to lower the temperature of one gram of a substance by one Celsius degree

Equation:

$$Q = m(\Delta T)C_p$$

$$Q = heat\ in\ Joules$$

$$m = mass\ in\ grams$$

$$\Delta T = Change\ in\ Temperature$$

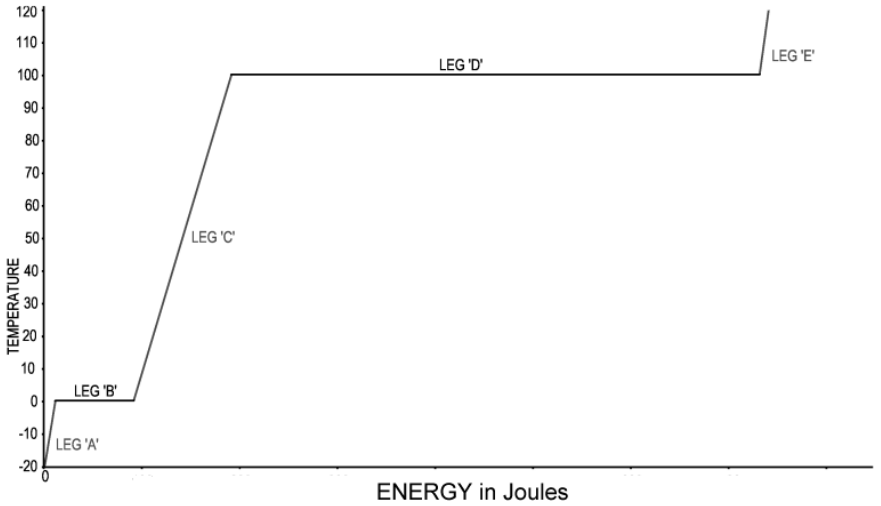
$$C_p = Specific\ Heat\ in\ \frac{J}{g \cdot °C}$$

Specific Heat Values:

$$For\ liquid\ water, C_p = 4.18\ \frac{J}{g \cdot °C}$$

$$For\ ice, C_p = 2.05\ \frac{J}{g \cdot °C}$$

$$For\ steam, C_p = 2.01\ \frac{J}{g \cdot °C}$$



- Temperature change for ice occurs along Leg “A”
- Temperature change for water occurs along Leg “C”
- Temperature change for steam occurs along Leg “E”