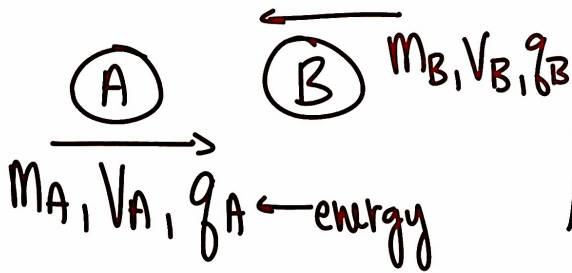


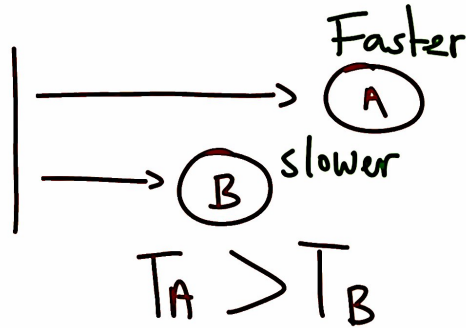
Heat (q) [unit: Joule, J]

Energy of an object based on the speed and mass difference of 2 objects.



Temperature (T) [unit: $^{\circ}\text{C}$, K]

Speed (velocity) of an object based on energy.



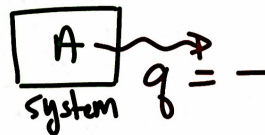
System and surroundings

Area/object focused on | All other parts of universe

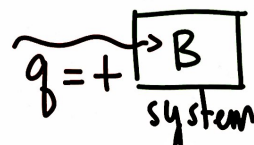
Surround. Most common! System Focus on A

system least common! System Focus around B

Exothermic ($q = -$)
Energy from system to surr.



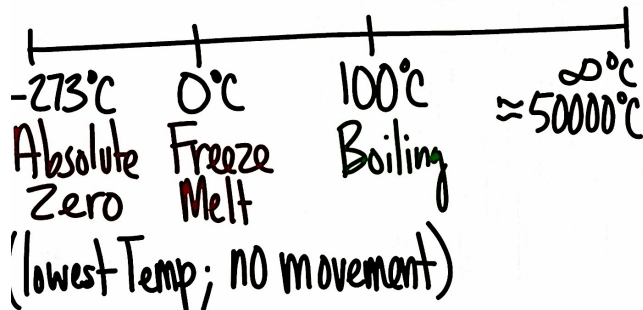
Endothermic ($q = +$)
Energy from surround to system



Temp. Units

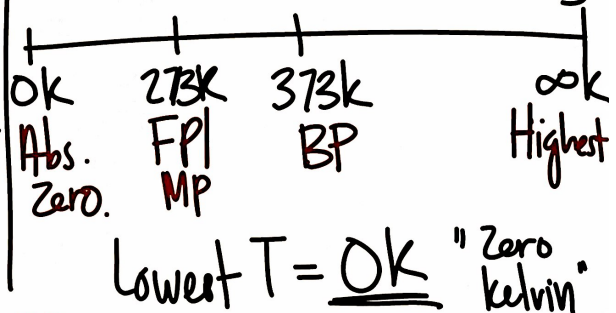
Std. Temperature

Celcius ($^{\circ}\text{C}$) [Based on MP/BP]



Absolute Temperature

Kelvin (K) [Based on 0 as abs. zero]



Temperature Conversions (Std and Abs. Temp)

$^{\circ}\text{C}$ and K have the same scale [$1^{\circ}\text{C} = 1\text{K}$]

$^{\circ}\text{C}$ starts @ -273°C

K starts @ 0 K

$^{\circ}\text{C} \rightarrow \text{K}$

$$\text{K} = ^{\circ}\text{C} + 273.15$$

$\text{K} \rightarrow ^{\circ}\text{C}$

$$^{\circ}\text{C} = \text{K} - 273.15$$

32.9 $^{\circ}\text{C}$, convert to K

$$\text{K} = 32.9 + 273.15 = 306.05\text{K (Kelvin)}$$

241.6K, convert to $^{\circ}\text{C}$

$$^{\circ}\text{C} = 241.6 - 273.15 = -31.55^{\circ}\text{C (Celcius)}$$

Change in Temperature

$$\Delta T = T_{\text{final}} - T_{\text{ini}}$$

(change) (end) (start)

$$\Delta T = +, \text{ inc. Temp}$$

(direct) $T \uparrow$ $q \uparrow$

$$\Delta T = -, \text{ dec. Temp}$$

(direct) $T \downarrow$ $q \downarrow$

Change in Heat

$$\Delta q = q_{\text{final}} - q_{\text{ini}}$$

(change) (end) (start)

$$\Delta q = -, \text{ lose } q, \text{ exo}$$

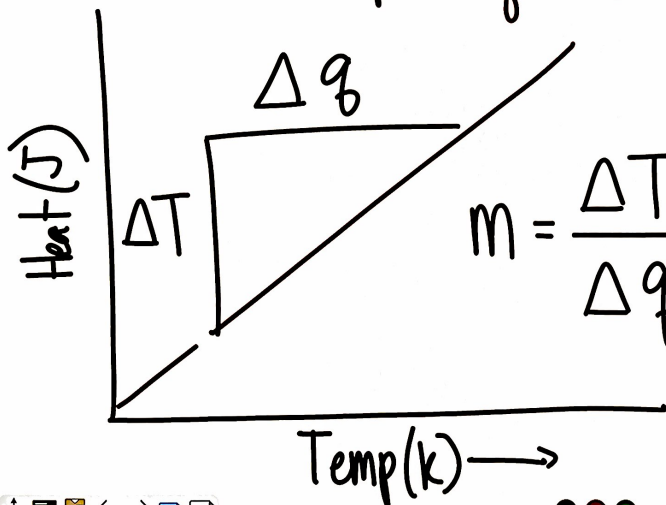
(cooling down)

$$\Delta q = +, \text{ gain } q, \text{ endo}$$

(warm up)

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Heat vs. Temp



$$\Delta T = - \text{lower } T$$

$$\Delta q = - \text{lose } q \text{ (exo)}$$

$$\Delta T \uparrow \Delta q \uparrow$$

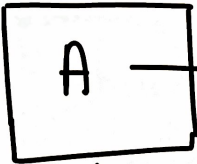
$$\Delta T \downarrow \Delta q \downarrow$$

$$m = \frac{\Delta T}{\Delta q} = + \text{ direct relationship}$$

$$\Delta T = - \Delta q = -$$

$$\Delta T = + \Delta q = +$$

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 $q_o = 92\text{ J}$
 $q_f = 12\text{ J}$
 $q_{\text{syst}} = -q_{\text{surr}}$
 $q_{\text{system}} = -80\text{ J}$
 $q_{\text{surr}} = +80\text{ J}$
 $\Delta q = q_f - q_o$
 $= 12\text{ J} - 92\text{ J}$
 $= \underline{\underline{-80\text{ J}}}$ $q_{\text{system}} (-, \text{exothermic})$