Chap 5 — Thermodynamics

"Change" direction
ACTIVE

Thermos

System heats up

HEAT

ABSORB

System Cool down

ENDOTHERMIC

RELEASED

EXOTHERMIC

heat Enters

Systems Point of view

heat exits tho system

Oct 15-7:38 AM

HOT                    Spontaneous.                    COLD        HEAT energy
                                                                    $\Delta H$
                                                                    Enthalpy

Lots of energy                                        Less Energy        JOULES

Give off energy Spontaneously          $\oplus \Delta H$ EXO

$\oplus \Delta H$ ENDO    Add energy    Non Spontaneous

Oct 15-7:48 AM

WORK = Force * distance

1$^{st}$ Law - Heat $\Leftrightarrow$ Work

2$^{nd}$ Law          Hot $\rightarrow$ Cold     Spontaneously

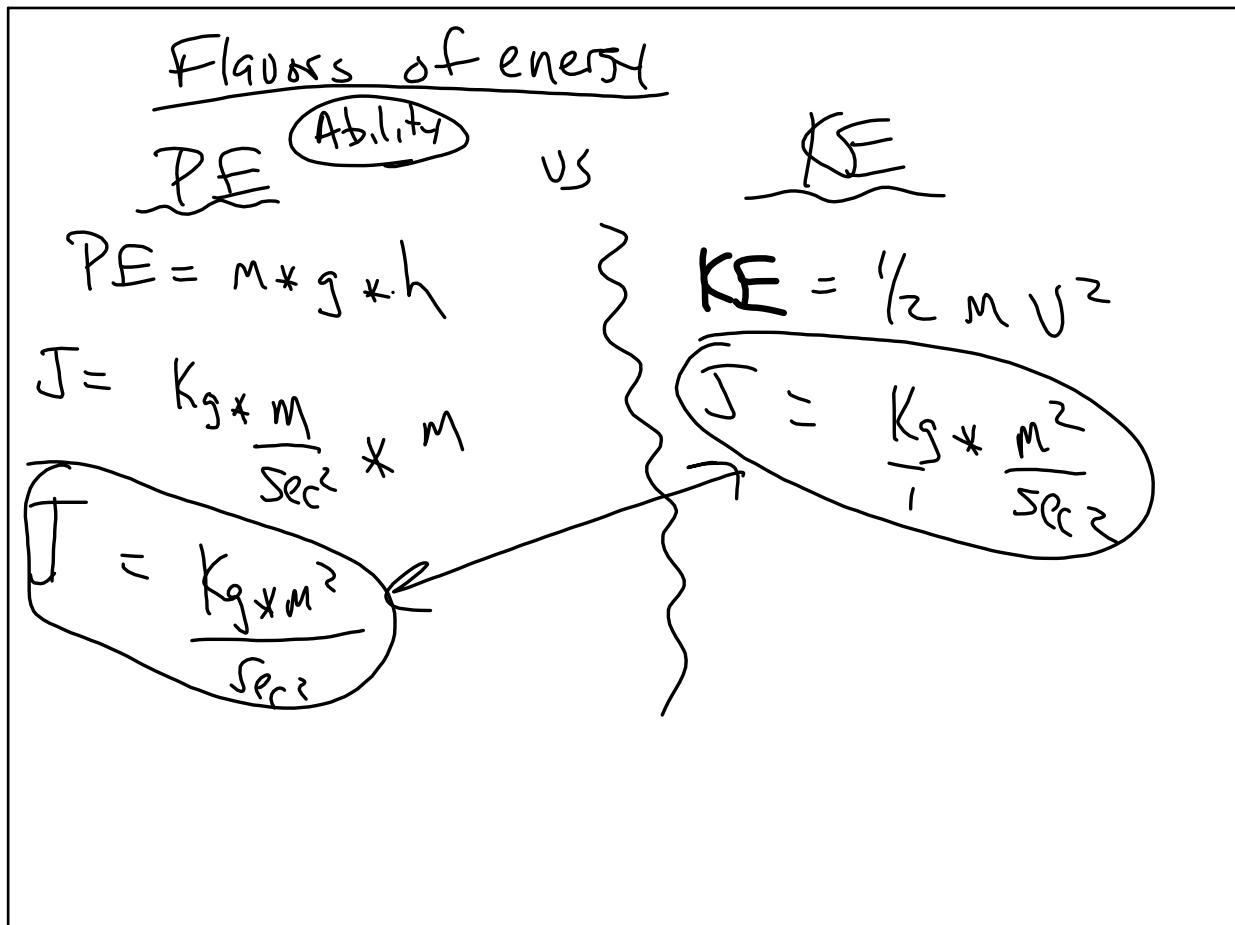3$^{rd}$ Law $\rightarrow$ To go to elemental (normal state)
No energy is needed

heat movement

① Conduction $\rightarrow$ Touch / contact.

② Convection - Air currents        oven $\rightarrow$ heat air
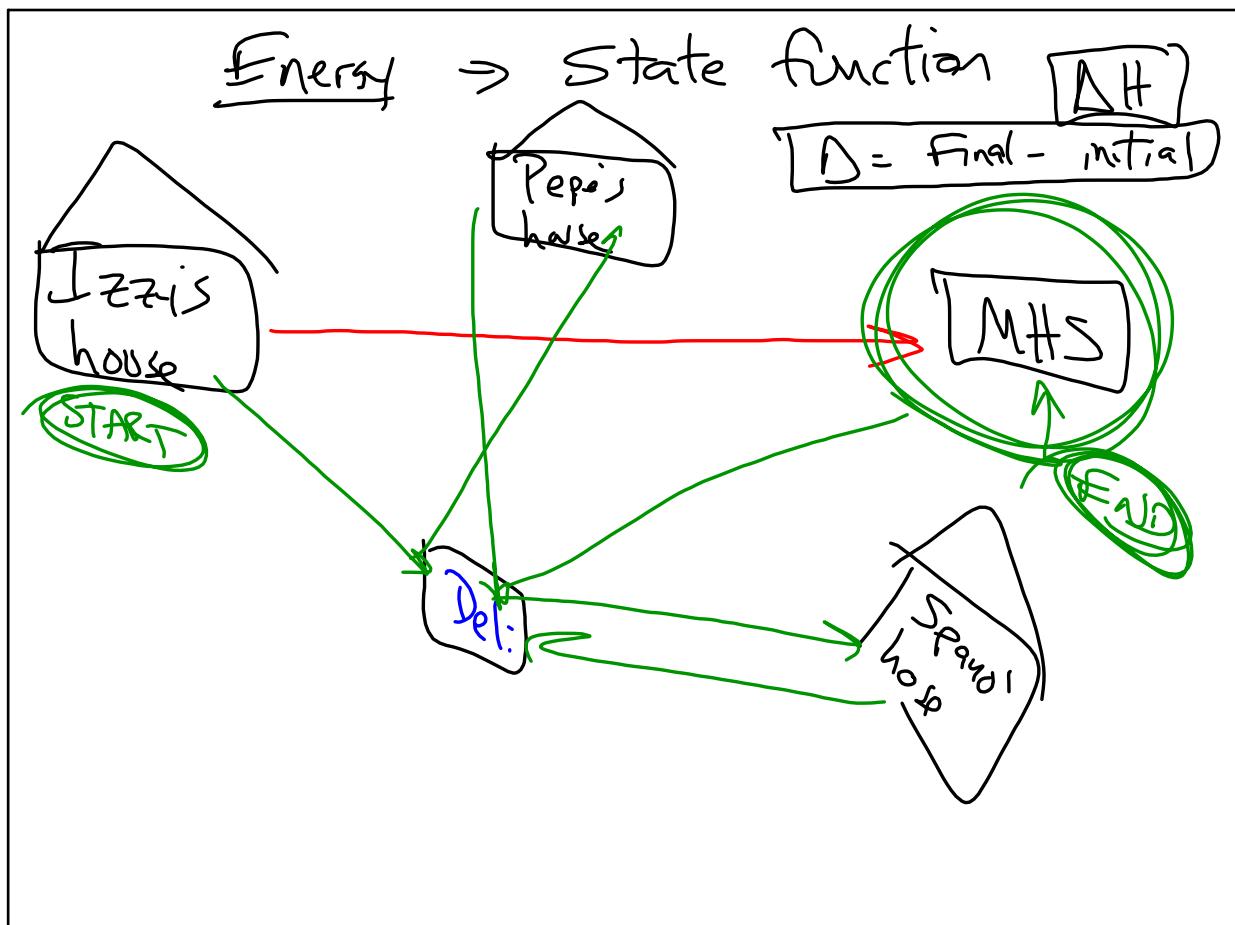                        $\rightarrow$ Wind.                          $\downarrow$
                                                        heats food.

③ Radiation $\rightarrow$ energy transmitted via waves
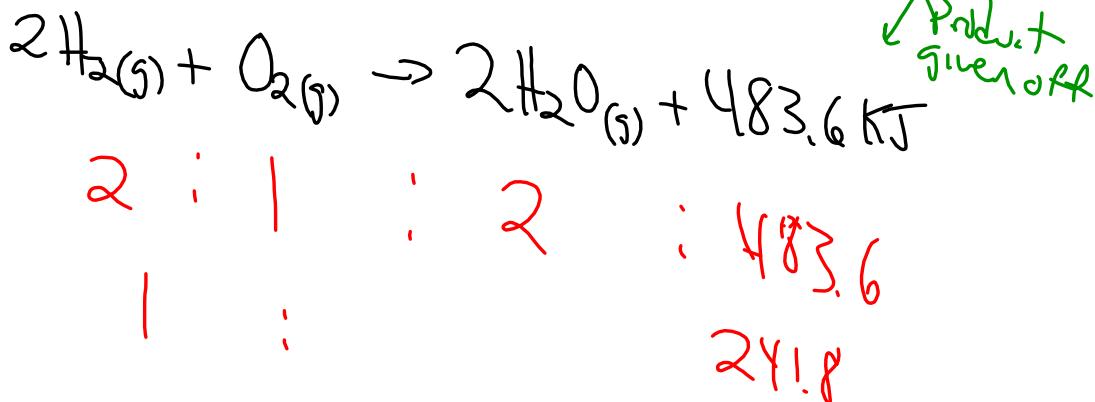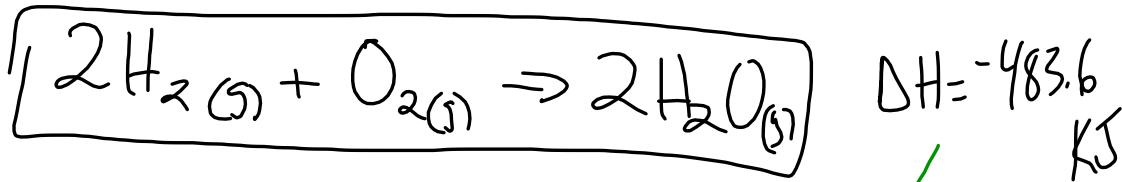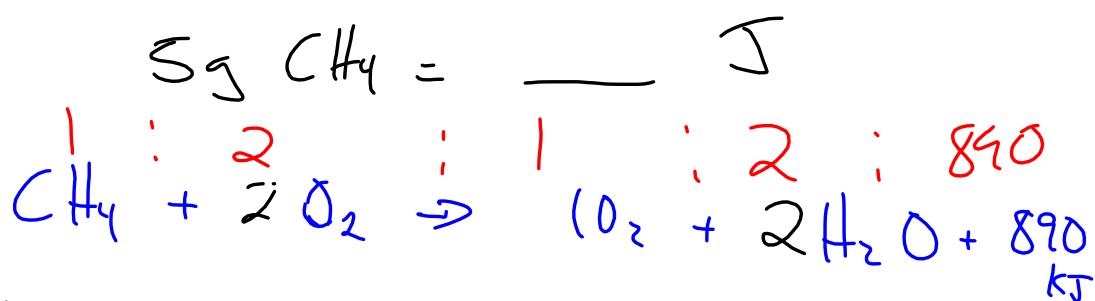                        Sun $\leftarrow$ $\rightarrow$ ex: light

Flavors of energy

PE (Ability)        vs        KE

$PE = m * g * h$

$J = Kg * \dfrac{m}{sec^2} * m$

$$J = \dfrac{Kg \times m^2}{sec^2}$$

$KE = \frac{1}{2} m v^2$

$$J = \dfrac{Kg * m^2}{sec^2}$$

Oct 15-8:12 AM

Energy ⇒ State function

$\Delta H$

$\Delta = Final - initial$

Izzi's house

START

Pepe's house

MHS

END

Del:

Spano's house

Oct 15-8:26 AM

Entropy        — Randomness ⇒ disorder

$$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(s)}$$

ΔH = $^-$483.6 kJ

$$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(s)} + 483.6 \, kJ$$

↙ Product
given off

2 : 1 : 2 : 483.6

1 : : 241.8

$CH_{4(g)}$ Combustion          ΔH = $-$890 kJ.

$$S_g \, CH_4 = \underline{\quad\quad} \, J$$

1 : 2 : 1 : 2 : 890

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + 890 \, kJ$$

$$\frac{S_g \, CH_4}{} \left| \frac{1 \, mole \, CH_4}{16g \, CH_4} \right| \frac{890 \, kJ}{1 \, mole \, CH_4} = 278.125 \, kJ$$

$$Q = M \, C \, \Delta T$$

J ← heat energy

M ↑ Mass

C ↑ Specific heat.

ΔT ← change in Temp

$H_2O$
$4.18 \, \text{J/}_{g °c}$

$$(KJ) = (Kg) * \frac{KJ}{Kg * °C} * °C$$

Oct 15-8:43 AM

$$5 \Big/ 14 + 44$$

Oct 15-8:46 AM