THERMO

AT THERMO (14)

Directions: Answer the following questions. Each is worth 5 points. You may need to use a combination of the following in order to communicate your understanding of the material: Diagrams, text, and mathematical equations and computations. Each question (even the bonus) is worth 5 points.

4) Thermodynamically, explain why slurping soup (or coffee, tea) or blowing on hot food will cause it's temperature to drop.

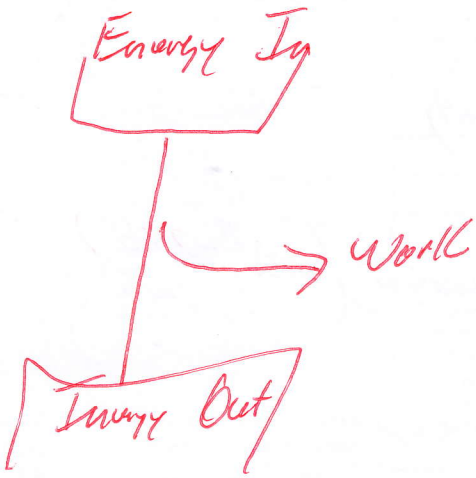
1st Law: Expanding Gas Work Out Reduces Internal Energy. "Splatter" Beverage Increase Surface Area

5) Anyone that cooks knows that boiling water gets no hotter while it is boiling. While this may seem to be a simple thing because we may see it daily, it is rather complex when considering the thermodynamics processes taking place. Why does the water stay at a constant temperature while boiling?

- Expansion Is A Cooling Effect by 1st Law
- Energy Added Changes Phase

Oriolos

6) Explain how heat engines operate. Include the limitations as they exist with current reciprocating engines



Need To Put A Lot of Work In

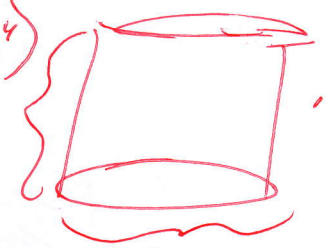
Bonus #2) Considering the thermal energy flowing through radiation only, determine the net heat of a covered black cup of hot tea measuring 7 cm in diameter and 8 inches tall in a room that is 73°F. Why would we be concerned about the cup being covered? (e=0.8)

8in = 20.3 in

$\propto e A(T^4 - T^4)$

$(5.67\times10^{-8})(.8)(.0485m^2)(373K^4 - 296^4)$

26.3



16.8 J/s Out of Cup.

Radiated... Stop

.00385 m^2

Total Surface Area

.0485 m^2

73°F = 22.8°C

100°C

$F = \frac{9}{5}C + 32$