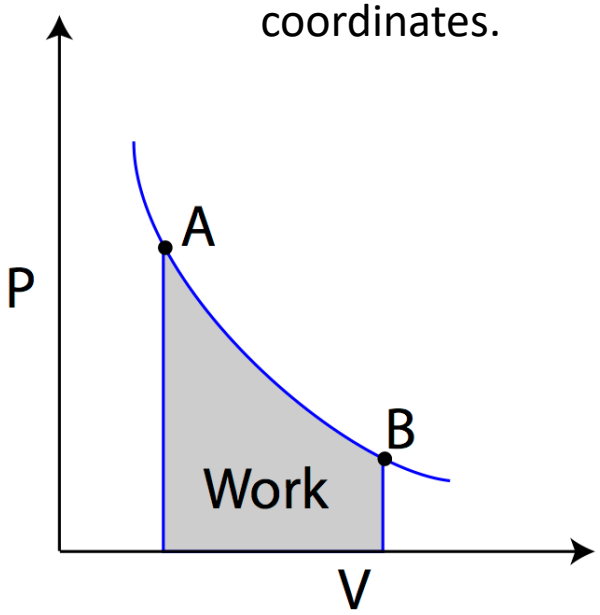
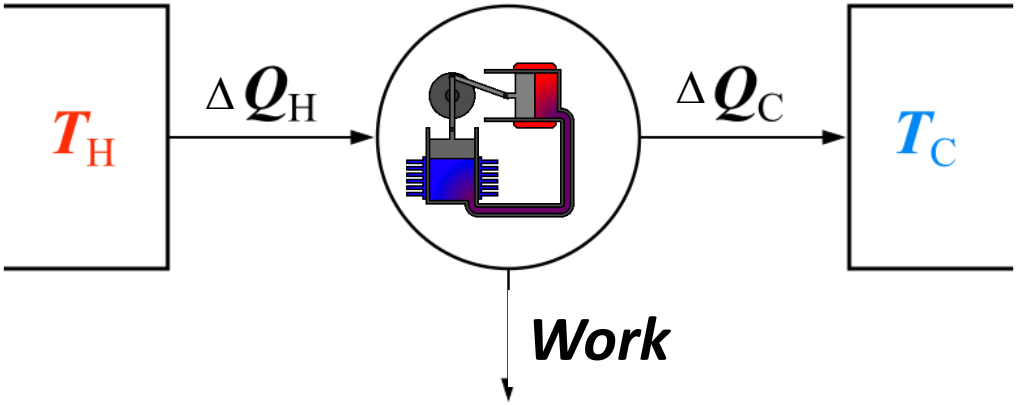
Applying the 1st Law of Thermodynamics to ideal gas

$$\Delta Q = \Delta E + \Delta W$$

- ΔQ - total heat adsorbed by gas
- ΔE – change in internal energy, $\Delta E = \mathrm{n} C_V \Delta T$. Here C_V is specific heat per mole at constant volume.
- Work ΔW can be found as an integral $\int P dV$, or area under P(V) plot coordinates.



Efficiency of Heat Engine



Heat Engine has to take heat ΔQ_H from "heat bath", and return heat ΔQ_C to a "cooler".

$$Work = \Delta Q_H - \Delta Q_C$$

Homework

A heat engine is using 1 mole of gas that undergoes the process shown on PV diagram. Find the change in internal energy , work done by the gas, and total heat adsorbed during each segment (a->b,b->c, and c->d).
Specific heat of the gas at constant volume is C_V =20 J/K/mol. Note that PV=RT for n=1 mole. Universal gas vconstant is R= 8.3 J/K/mol

	Δ E, J	Δ W, J	Δ Q,J
a->b			
b->c			
c->a