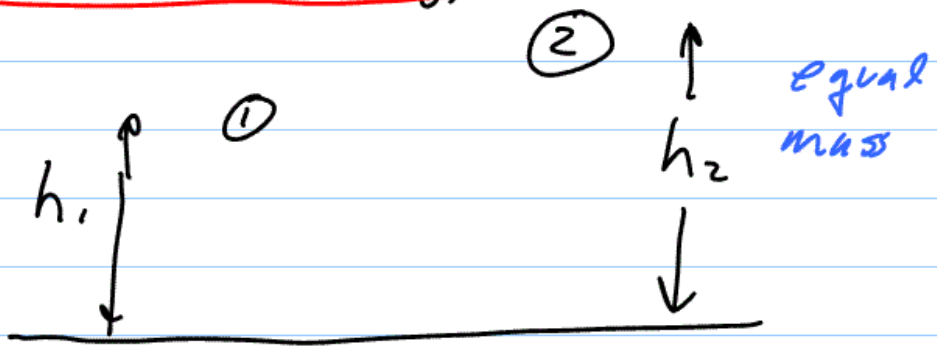
PHY100S - The Magic of Physics - Class 6

"[Classical thermodynamics] is the only physical theory of universal content that I am convinced, within the areas of the applicability of its basic concepts, will never be overthrown."
-- Einstein, 1949

§6.3 Grav. Energy



work = weight × height

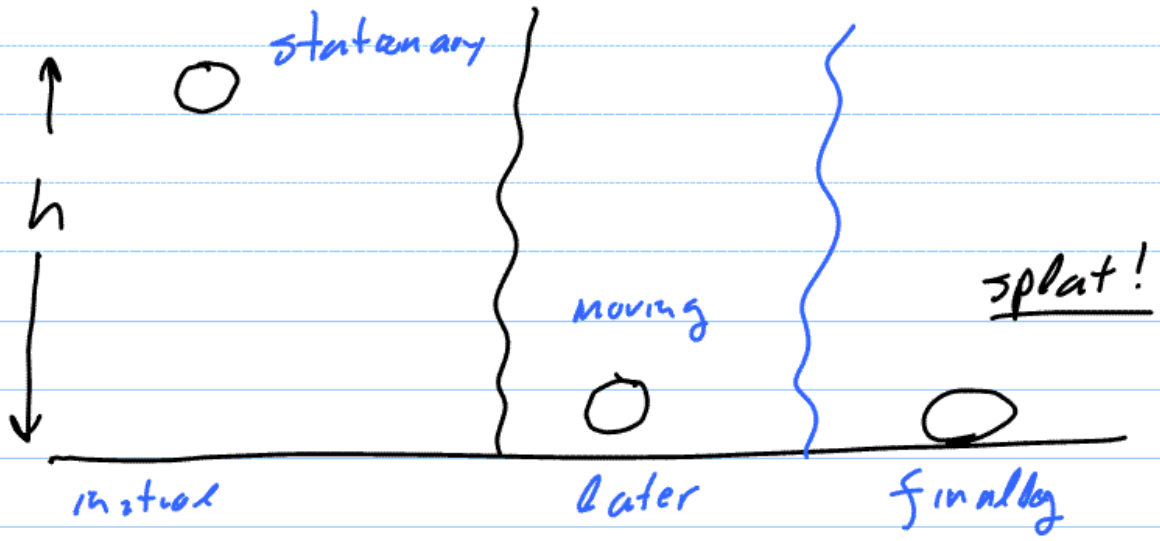
$= \frac{1}{2} m s^2$

more potential for gravity to do work on 2 than on 1

GravE = weight × height

As it falls! GravE down
KinE up

GravE + KinE constant
"conserved"



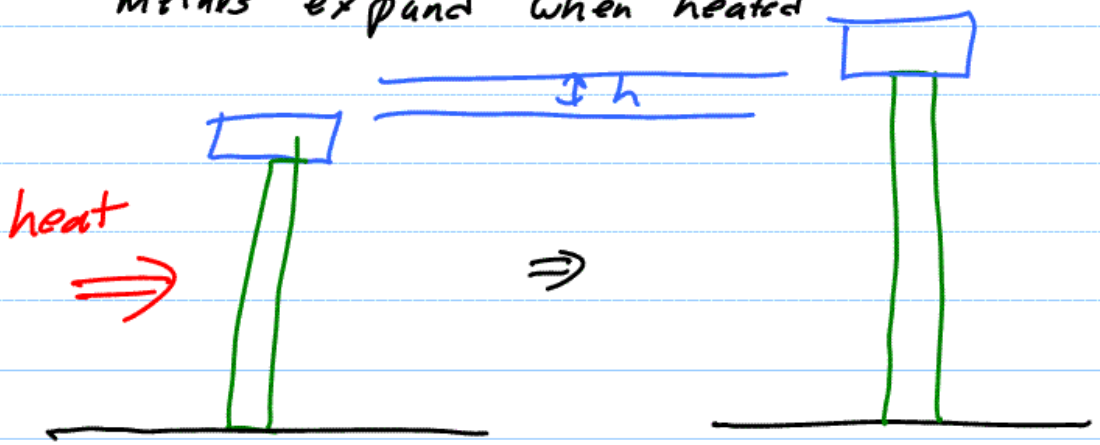
GravE ⇒ KinE ⇒ thermal energy ThermE

Total Energy is Conserved

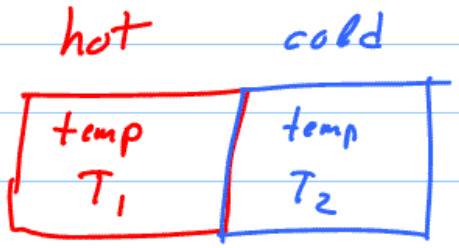
CHAPTER 7 - THERMODYNAMICS

Convert ThermE to work. "HEAT ENGINE"

metals expand when heated



§7.1

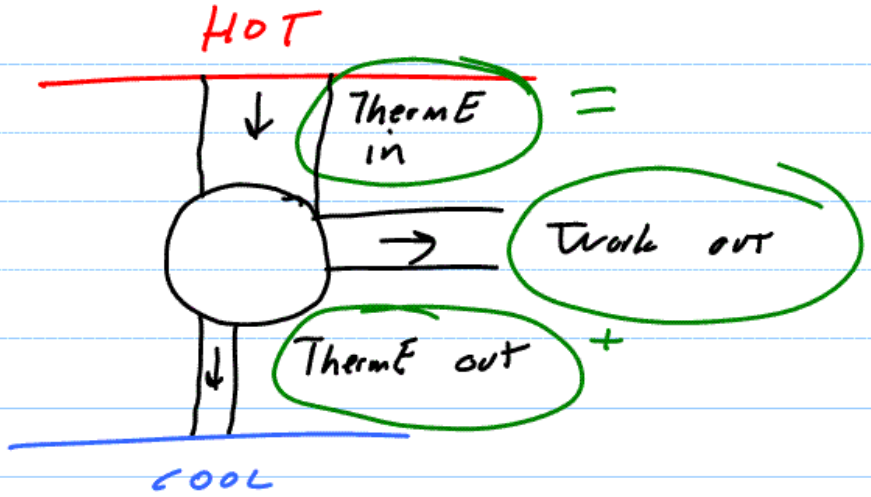


heat flow

Heat always spontaneously flows from hotter to colder

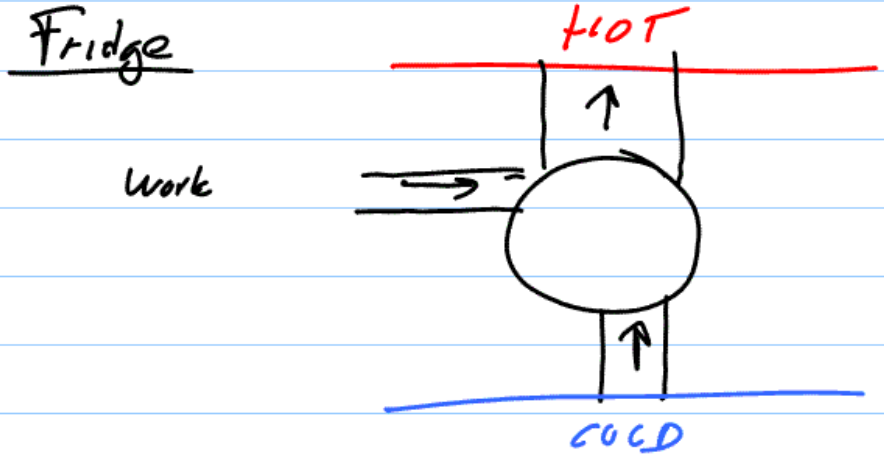
rate of heat flow $\propto T_1 - T_2$

§7.2 - Heat Engine



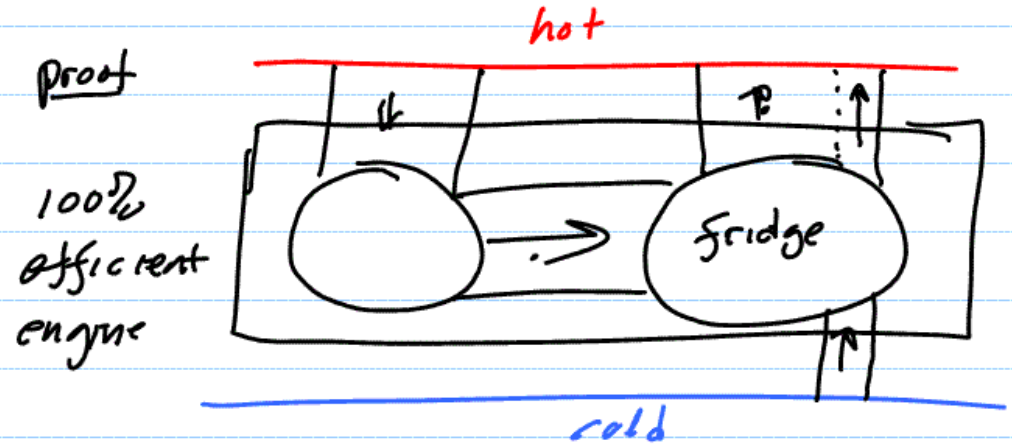
$$\text{efficiency} = \frac{\text{Work out}}{\text{Therm E in}}$$

Fridge



No heat engine can be 100% efficient

Proof



§7.3 Nothing to add