2016-09-08 ISO8601

Agenda:

- http://cosmo.nyu.edu/hogg/physics1/
- Dimensional analysis & S.I. units.
- * Densities of air, ice
- Proportional reasoning...?

testing.

$PV = NRT$ @ STP. 10^5 Pa ~~300 K~~ 273 K

$\frac{22.4\ \ell}{\text{mol}}$

air: N_2 $28\ \frac{g}{mol}$

$28\ g\ mol^{-1}$

S.I. units

kg m s

$(28\ g\ \cancel{mol^{-1}})(22.4\ \ell\ \cancel{mol^{-1}})^{-1}$

$\left(\frac{28\ g}{22.4\ \ell}\right)\left(\frac{1\ kg}{1000\ g}\right)\left(\frac{1000\ \ell}{1\ m^3}\right) \sim 1.25\ \frac{kg}{m^3}$

densities

air: $1.25 \frac{kg}{m^3}$

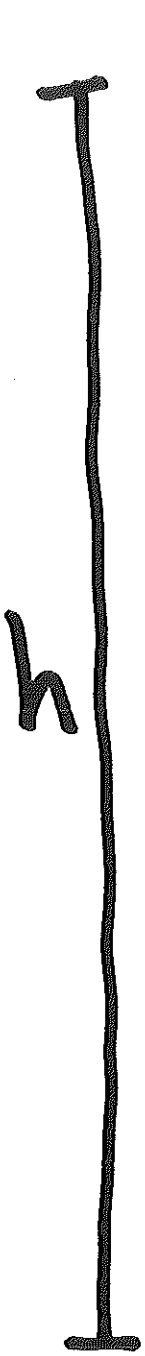
ice/water: $\left(1 \frac{g}{cm^3}\right)\left(\frac{1\ kg}{1000\ g}\right)\left(\frac{100\ cm}{1\ m}\right)^3$

$: 1000 \frac{kg}{m^3}$

rock: $2000 - 5000 \frac{kg}{m^3}$

heavy metal: $20{,}000 \frac{kg}{m^3}$

} range is small. set by Q.M. (+ nuclear mass)



Ignore air resistance

m: mass – kg

g: acceleration – $\frac{m}{s^2}$

h: length – m

$\sqrt{\frac{h}{g}}$ ~ time

π? 7! $\frac{1}{\sqrt{2}}$