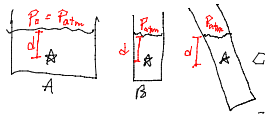
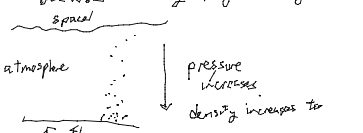


Where is pressure greatest?

A B C (D) All the same

$$P = P_0 + \rho g d$$

In a gas, it's a little different because density of gas changes



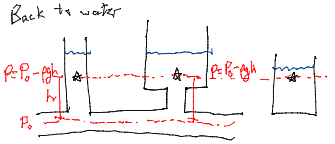
pressure is proportional to density, & depends on temperature

Weather comes from fluctuations in density & pressure

- high pressure & low pressure systems

H wind due to pressure differential L

Back to water



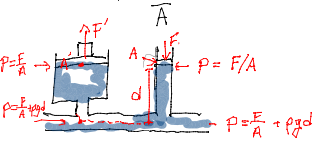
Rules about pressure

1) Pressure where liquid is in contact with atmosphere: $P = P_{atm}$

2) Where liquid is in contact with another gas $P = P_{gas}$

3) If force applies to liquids

$$P = \frac{F}{A}$$



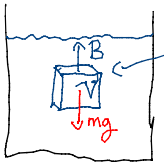
Pascal's Principle:

If force is applied to a fluid, pressure everywhere in fluid increases by same amount

$$\frac{F'}{A'} = \frac{F}{A} \rightarrow F' = F\frac{A'}{A}$$ ← bigger

hydraulic jack

Buoyancy

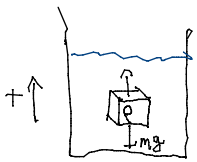


chunk of water

Feels force mg downward

Buoyancy force counteracts this

$$B = mg = \rho_{water} V g$$



If I replace water with other material with density ρ

B: same as before

$$F_{net} = -mg + \rho_{water} V g$$

$$= -(\rho V) g + \rho_{water} V g$$

$$= V g (\rho_{water} - \rho)$$

$F_{net} > 0 \rightarrow$ float $\rightarrow \rho_{water} > \rho \rightarrow \rho < \rho_{water}$

$\rho > \rho_{water} \rightarrow F_{net} < 0 \rightarrow$ sinks

$$\vec{B} = \rho_{fluid} V_{displaced} g \uparrow$$

e.g. people $V = 0.15\ m^3$

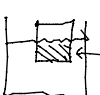
underwater $B = (1000\ \frac{kg}{m^3})(0.15\ m^3)(9.8)$

$\approx 1500\ N \uparrow$

in air $B = (1.2\ \frac{kg}{m^3})(0.15\ m^3)(9.8)$

$\approx 1\ N \uparrow$

for submerged objects, $V_{displaced} = V_{object}$

floating  $V_{displaced} < V_{object}$