

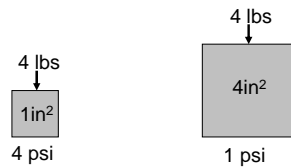
10-2 Pressure

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

Larger Force → Higher Pressure

Larger Area → Lower Pressure

A 4 lb weight is spread over two different areas. These areas are 1 square inch and 4 square inches. Which has a higher pressure?



1

10-2 Pressure

Newton – SI unit of force

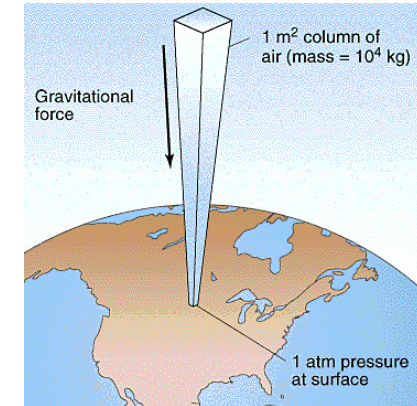
$$1 \text{ N} = \frac{\text{Kg m}}{\text{s}^2}$$

Air Pressure at Sea Level
1.03 Kg / cm² or 10.1 N / cm²

Air pressure is from weight of gases pressing on the earth

78% N₂
21% O₂
1% Other

Air pressure pushes on all sides and directions



2

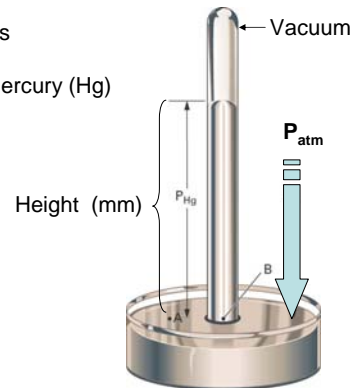
10-2 Pressure

Barometer – device used to measure atmospheric pressure

- invented by Torricelli in early 1600s

- Pressure measured by height of Mercury (Hg)

At Sea Level:
Height of Hg = 760 mm
Height of H₂O = 34 ft



3

10-2 Pressure

Units of Pressure & Conversions

- Millimeter of mercury (mm Hg)
- Torr (torr)
- Pascal (Pa) = 1 N/m²
- Pounds per square inch (psi)
- Atmosphere (atm): average pressure at sea level

$$1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ torr} = 101,325 \text{ Pa} = 14.7 \text{ psi}$$

Example: A certain car tire is supposed to be inflated to 30 psi. What is that in mm Hg?

$$30 \text{ psi} \left[\frac{760 \text{ mm Hg}}{14.7 \text{ psi}} \right] = 1551 \text{ mm Hg}$$

4