I will be able to calculate pressure.
I will be able to explain the difference between atmospheric, absolute and gauge pressure

Pressure

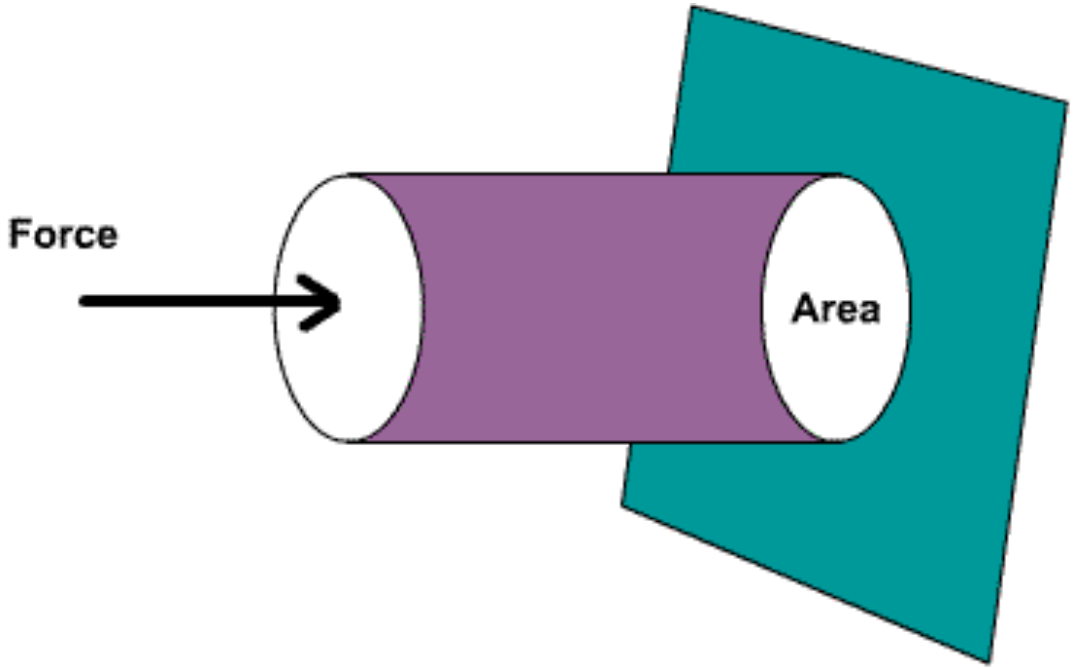
Try This…

- Stand up. Notice the force between your feet and the floor.
- Now stand on one foot. Is there any change in the force you feel between your foot and the floor?
- Now lift your heel off of the floor to try to stand on the ball of your foot only, or the tips of your toes on that one foot. What do you notice now?
- Could you get to the point of standing on one toe? How might special shoes and a lithe and petite body enable a ballerina to achieve this difficult feat?

With less surface area between your feet and the floor, it is more difficult to support your own weight!

Pressure

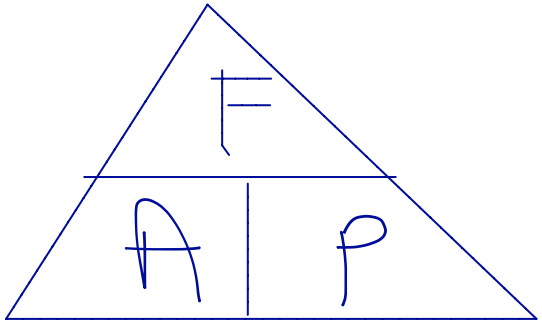
- **Pressure** is a measure of the amount of force that is on a certain area of space.



https://www.youtube.com/watch?v=v02iE94iA0A

Pressure Calculations

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



- Pressure is measured in Pascals (1 Pa = 1 N / m^2)
- Note you may need to calculate:
  - Area (A=lw…or other formulas)
  - Force (F=mg…where g=9.8m/s^2)

1 kg x 1 m/s^2
= 1 Newton

Example 1

- If your mass is 50.00 kg, and you supported that mass on one big toe with an area of 2.000 cm^2 . Calculate the pressure.

(1) Mass in to Force

$F = mg$

$= (50\,kg)(9.8\,m/s^2)$

$F = 490\,N$

(2) Convert cm^2 to m^2

$1cm \times 1cm = 1cm^2$

$0.01m \times 0.01m = 0.0001\,m^2$

$\therefore 1cm^2 = 0.0001\,m^2$

$2\,cm^2 = 2 \times 0.0001\,m^2$

$= 0.0002\,m^2$

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

$$= \frac{490\ \text{N}}{0.0002\ \text{m}^2}$$

$$= 2\ 450\ 000\ \frac{\text{N}}{\text{m}^2}$$

$$= 2\ 450\ 000\ \text{Pa}$$

$$\div 1000 \quad = 2\ 450\ \text{kPa}$$

Example 2

- What pressure does a 3 000 kg truck exert on a rectangular surface measuring 2.0 m by 1.5 m?

① $F = mg$

$= (3000\ kg)(9.8\ m/s^2)$

$F = 29\,400\ N$

② $A = lw$

$= (2.0\ m)(1.5\ m)$

$= 3.0\ m^2$

③ $P = \frac{F}{A}$

$P = \frac{29\,400\ N}{3.0\ m^2}$

$= 9800\ Pa$ OR $9.8\ kPa$