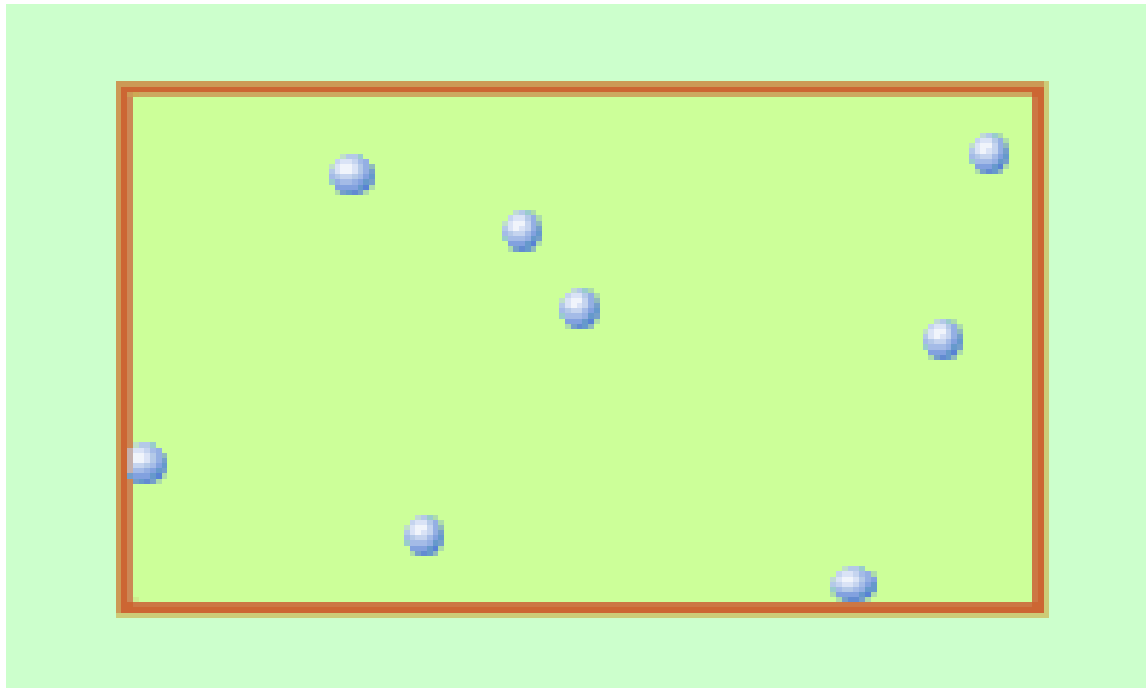# Pressure

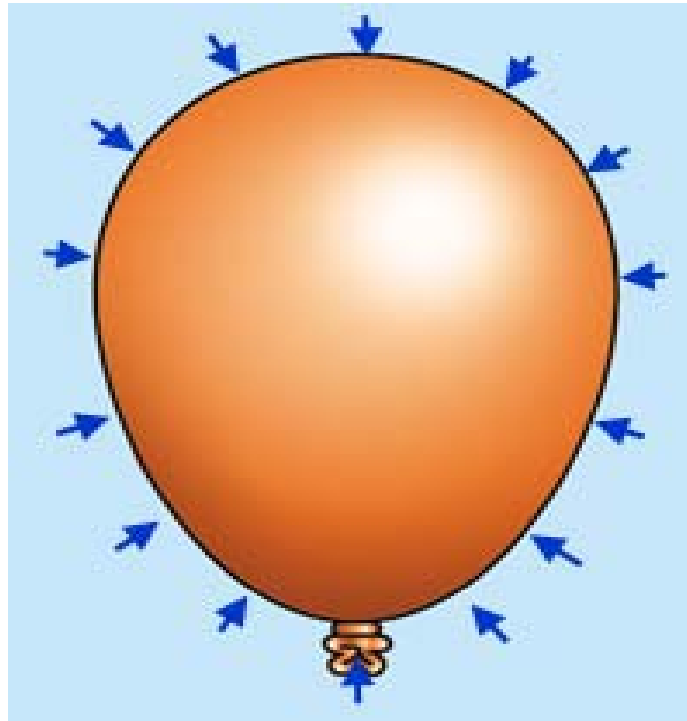## **Pressure = Force / Area**

Units of Pressure = Pascal

= Newtons/meter^2

What is a Gas?

Air Pressure Direction

Pressure Balancing Act

Ideal Gas Law

$$P = NkT/V$$

N = Number of Particles

T = Temperature of the Gas

V = Volume of the Container

k = 1.38×10^{-24} J/K

Change Air Pressure by Changing Amount of "Stuff"

- **Increase** number of particles (N) **increase** pressure (P)
- Example: Inflating a balloon

- **Decrease** number of particle, **decrease** pressure
- Example: Deflating a balloon

Changing Air Pressure by Changing Temperature

- **Decrease** the temperature (T), particles move slower, **decrease** pressure
- Example: Cooling a balloon

- **Increase** the temperature, particles move faster, **increase** pressure
- Example: Balloon heating up
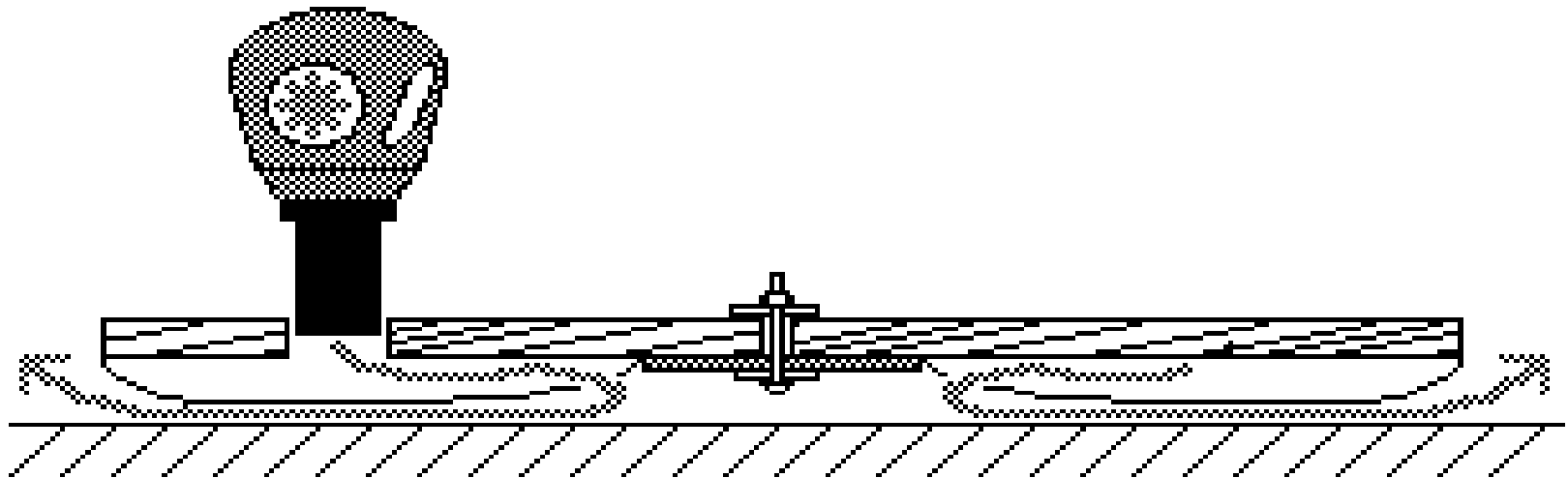
Changing Air Pressure by Changing Volume

- **Increase** the volume of the container, **decrease** pressure
- Example: Breathing in

- **Decrease** the volume of the container, **increase** pressure
- Example: Breathing out

How Much is the Air Pushing on Newspaper?

Force   = Pressure x Area

= Pressure x (Length x Width)

= 100,000 Pa x _____ m

x _____ m

= _____ N

"Weight" = _____ N / 9.81N/kg

= _____ kg

= _____ lbs

How Does It Work?

Canadian Coast Guard Hovercraft Lower Mainland Based

CCG CG-045

- Built in 1969
- Length: 14.76 m
- Breadth: 7 m
- Weight: 18 tonnes
- Max Speed: 50 knots
  92.6 kph
- Out of service
  - □ Oct 8, 2002

Canadian Coast Guard Hovercraft Lower Mainland Based

CCG SIYAY

- Built in 1998
- Length: 28.5 m
- Breadth: 12 m
- Weight: 70 tonnes
- Max Speed: 48 knots
  88.9 kph