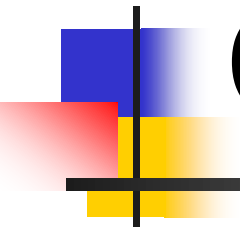


Chapter 3

Forces and Fluids

3 – 1 Pressure

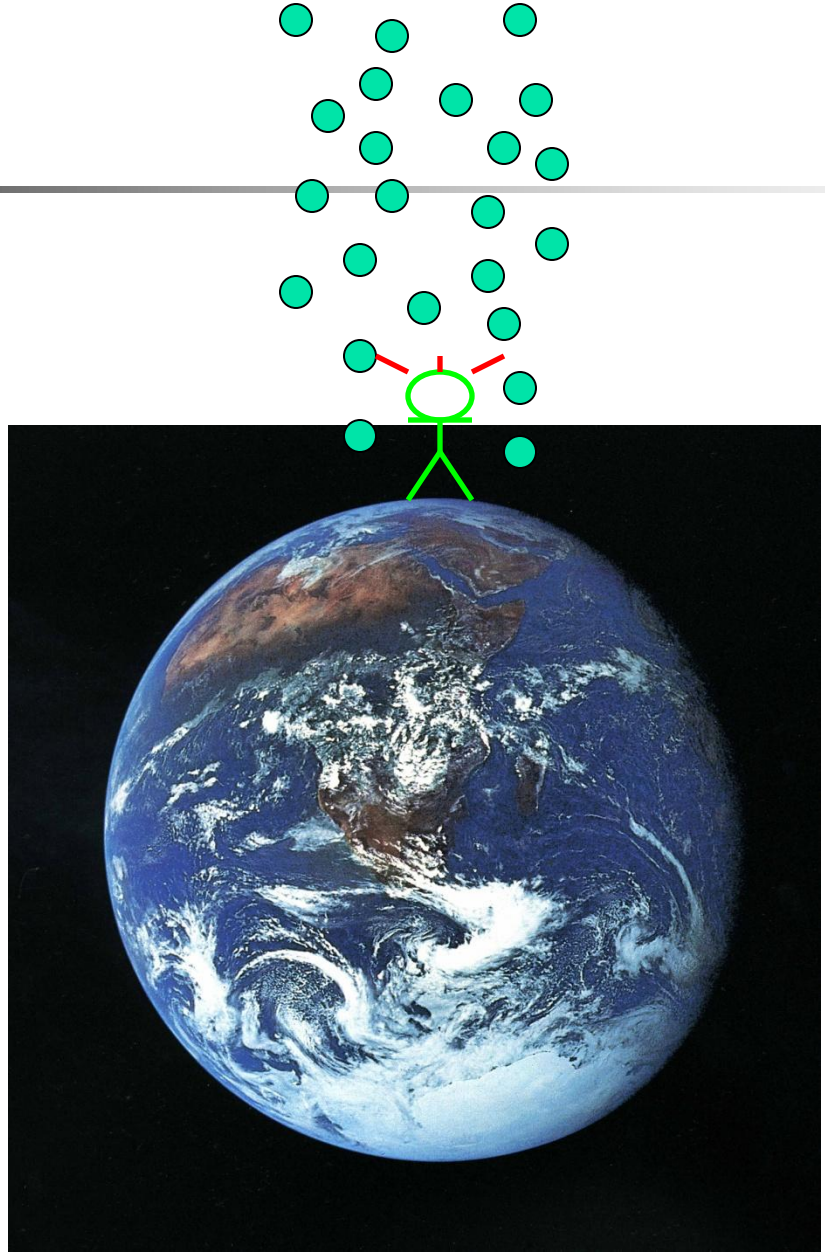
- Pressure – the amount of force exerted per unit of area.
- Measured in units of Pascals (Pa) or kilopascals (kPa).
- One pascal is equal to a force of 1 N applied over an area of 1 m^2, or 1 Pa = 1 N/m^2
- Pressure = $\frac{\text{Force}}{\text{Area}}$
- $P = \frac{F}{A}$

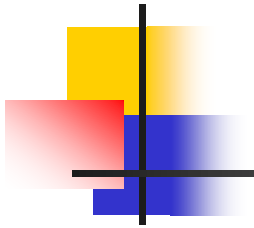
Fluids

- Fluid – any substance that has no definite shape and has the ability to flow.
  - Liquids
  - Gases

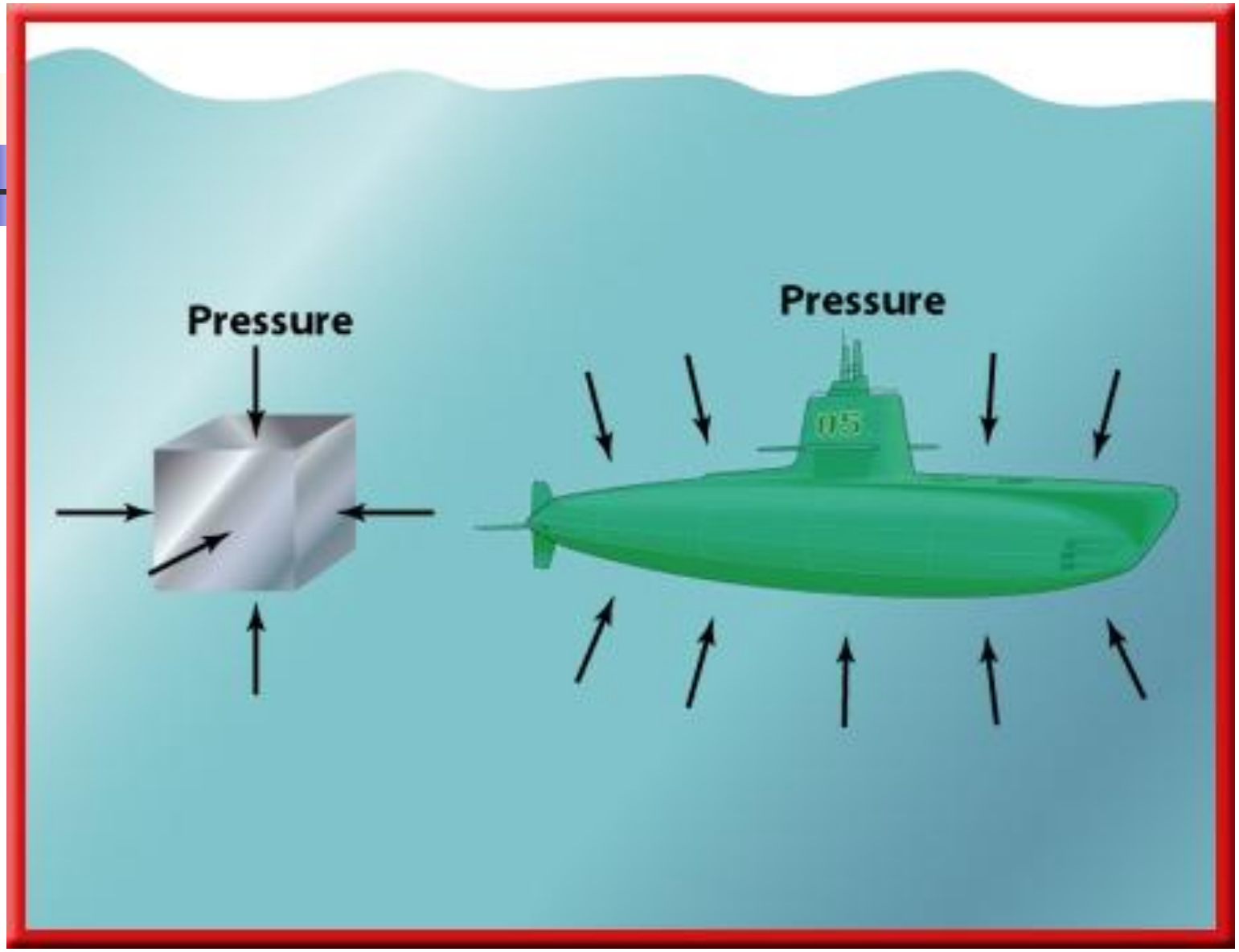
Air Pressure

- The atmosphere exerts pressure on our bodies.
- As you climb a mountain, there is less air pushing down on you, therefore there is less air pressure.



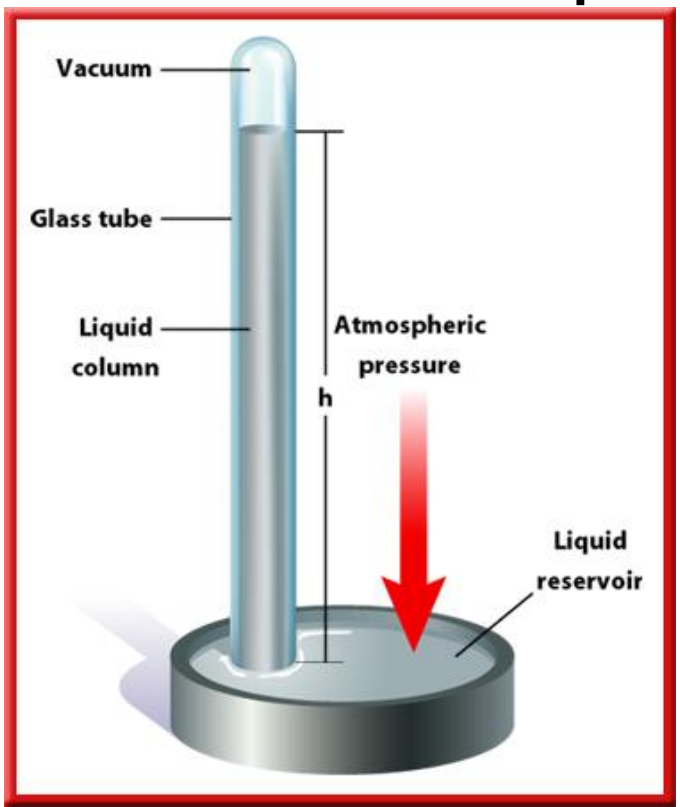


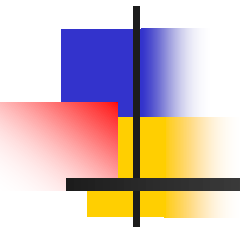
- Pressure is exerted on an object perpendicular to its surface.


Pressure
Pressure
005

Barometer

- An instrument called a barometer is used to measure atmospheric pressure.





3 – 2 Why do objects float ?

Buoyancy

- Buoyant Force – the ability of a fluid to exert an upward force on an object immersed in it.

Will it float ?

- If the buoyant force equals the force of gravity, then it will float


3
Gravity
If there was a post in the middle of the esert someone would hit it.....
(did you notice the nam
Buoyant Force

- If the buoyant force is greater than the force of gravity, then it will rise.


Gravity
Buoyant Force

- If buoyant force is less than the force of gravity, then it will sink.

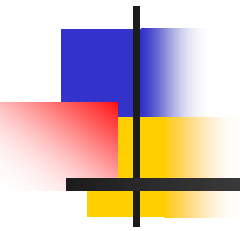

Gravity
Buoyant Force

Buoyant Force and Shape

- The amount of Buoyant Force is determined by :
  - SHAPE of the object

Archimedes' Principle

- Archimedes' Principle – the buoyant force on an object in a fluid is equal to the weight of the fluid displaced by the object.

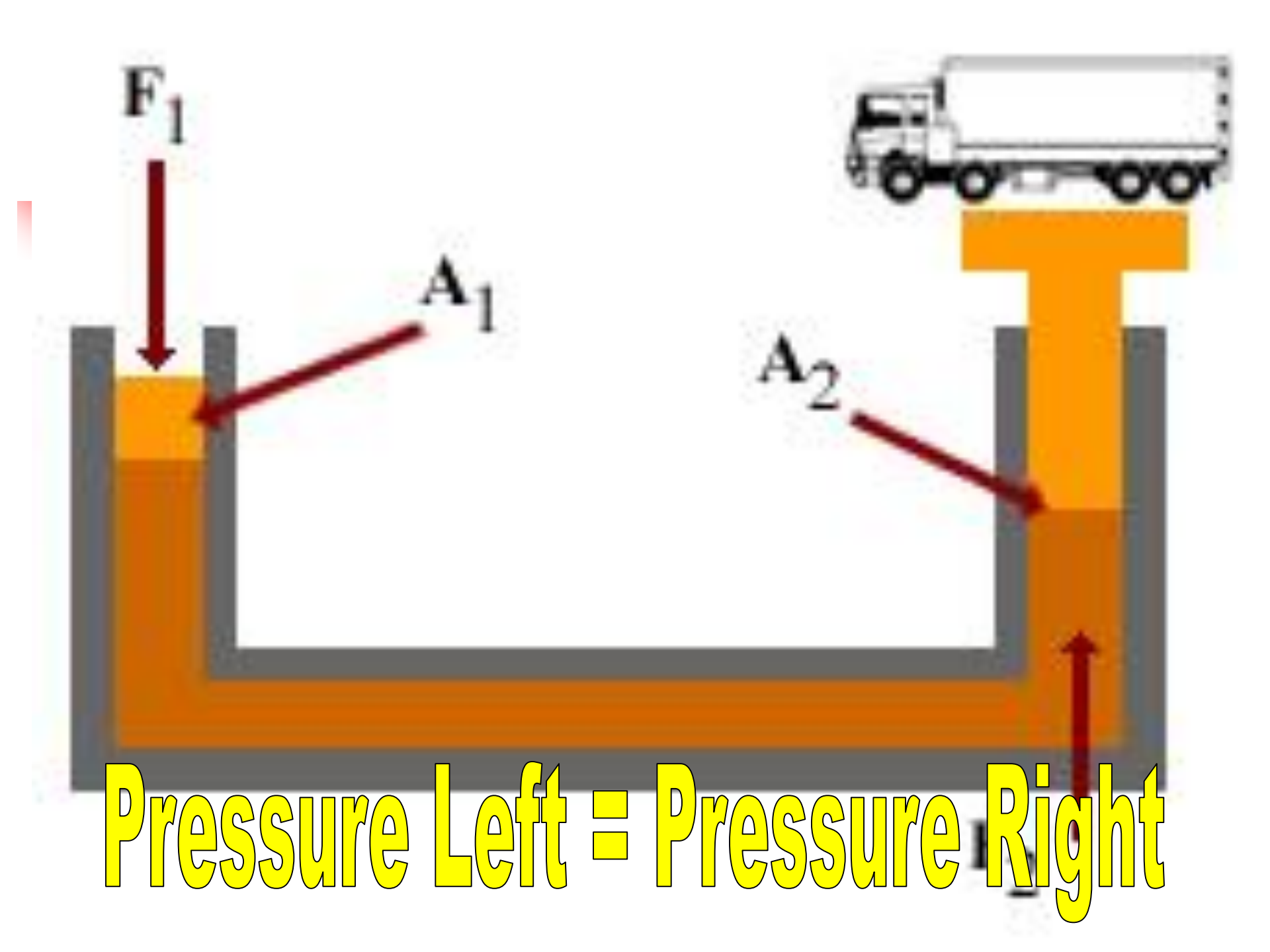


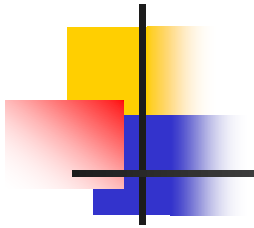
3 – 3 Doing Work with Fluids

Pascal's Principle

- Pascal's Principle – the pressure applied to a fluid is transmitted unchanged throughout the fluid.


100 Pa
100 Pa
Crest


F1
A1
A2
Pressure Left = Pressure Right

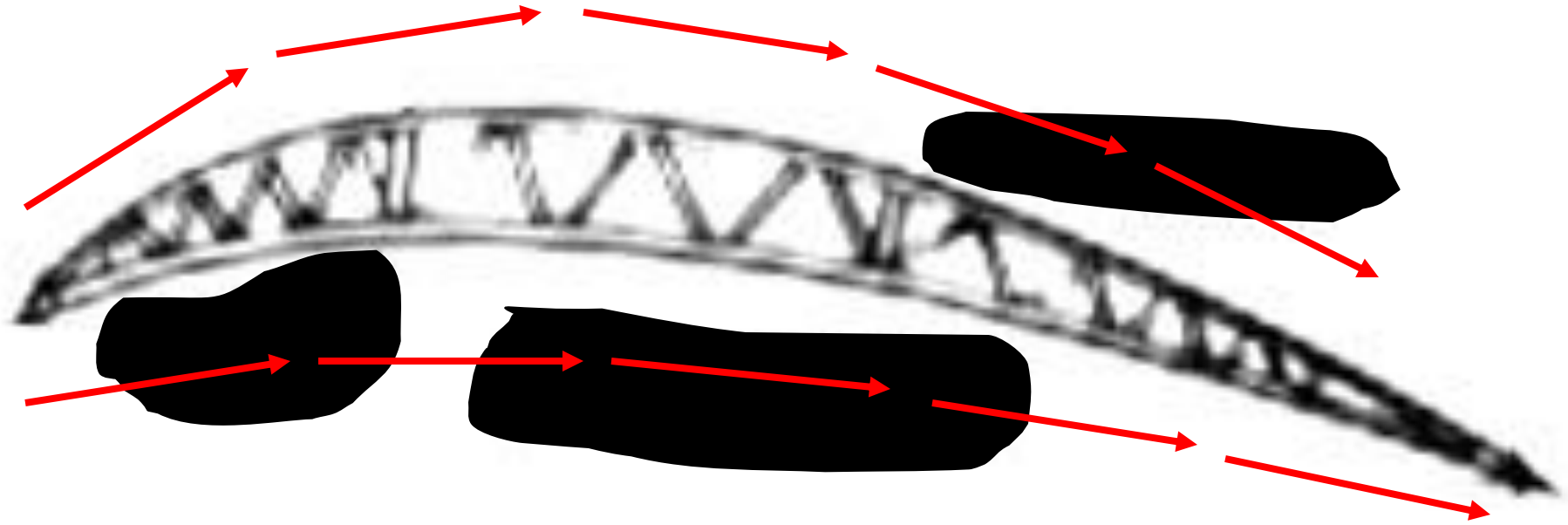


- Pressure L. = Pressure R.
- Force/Area = Force/Area
- 100 N/10 cm^2 = F / 100 cm^2
- 10 Pa = F / 100 cm^2
- 1000 N = Force

Bernoulli's Principle

- Bernoulli's Principle – as the velocity of a fluid increases, the pressure exerted by the fluid decreases.

The air on top will have to move faster to meet the air on the bottom



Venturi Effect

- Venturi Effect – reduction in fluid pressure resulting from the speed increase as fluids are forced to flow faster through narrow spaces.

- Squeezing a hose makes it flow faster and squirt further.
- Wind in cities blows faster between the tall buildings.