

Section 6-1

Pressure



Forces in Fluids

What is pressure?

⇒ **A force pushing on a surface**

How do force and pressure differ?

⇒ **Your downward force (weight) doesn't change. You can spread it out over a larger/smaller area changing the pressure exerted.**



How do you calculate pressure?

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

What is the unit for pressure?

⇒ **N/m² or Pascal**



Forces in Fluids

⇒ **A fluid is a substance that can easily flow**

⇒ **All the forces exerted by the individual molecules in a fluid add together to make up the pressure exerted by the fluid.**



Forces in Fluids

⇒ **Air is a fluid.**

⇒ **In a fluid that isn't moving, pressure at a given point is exerted equally in all directions.**

⇒ **Air pressure decreases as elevation increases.**

⇒ **Water pressure increases as depth increases**



Section 6-2

Transmitting Pressure in a Fluid



Pascal's Principle (Blaise Pascal):

When force is applied to a confined fluid, an increase in pressure is transmitted equally to all parts of the fluid.



***A hydraulic system* multiplies a force by applying the force to a small surface area. The increase in pressure is then transmitted to another part of a confined fluid, which pushes on a larger surface.**



Section 6-3

Floating and Sinking



Forces in Fluids

buoyant force:

- the force that water exerts on a submerged object.

Archimedes' principle:

- the buoyant force on an object is equal to the weight of the fluid displaced by the object.



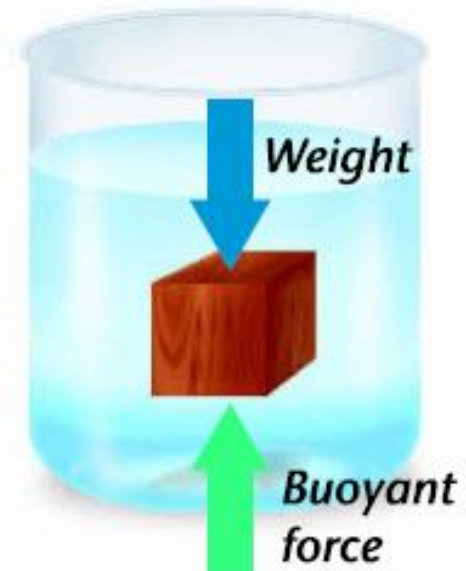
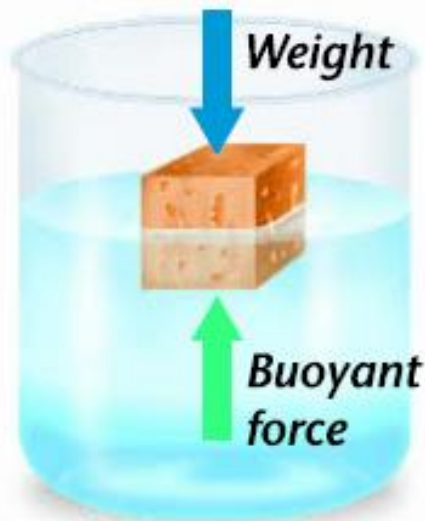
Two forces working against each other:

- 1. Weight**
- 2. Buoyant force**



Forces in Fluids

17 Floating and Sinking



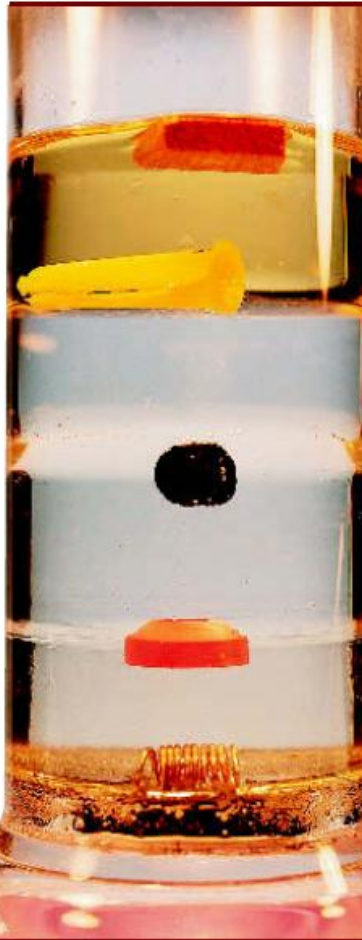
The density of an object compared to the density of a fluid will determine if the object floats in that fluid.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

An object that is more dense than the fluid in which it is immersed sinks. An object that is less dense than the fluid in which it is immersed floats to the surface.



18 Density



| Substance | Density (g/cm³) |
|----------------------|---------------------------------------|
| <i>Wood</i> | 0.7 |
| <i>Corn oil</i> | 0.925 |
| <i>Plastic</i> | 0.93 |
| <i>Water</i> | 1.00 |
| <i>Tar ball</i> | 1.02 |
| <i>Glycerin</i> | 1.26 |
| <i>Rubber washer</i> | 1.34 |
| <i>Corn syrup</i> | 1.38 |
| <i>Copper wire</i> | 8.8 |
| <i>Mercury</i> | 13.6 |



Floating and Sinking

| Position of Object | Weight vs. Buoyant Force |
|-----------------------|--------------------------|
| Floating at surface | Buoyant force greater |
| Sinking | Weight greater |
| Suspended under water | Forces balanced |



Section 6-4

Applying Bernoulli's Principle



Forces in Fluids

Two ping-pong balls are suspended from strings. What will happen when you blow between them?

Why did this happen?



Bernoulli's principle:

- the pressure exerted by a moving stream of fluid is less than the pressure of the surrounding fluid



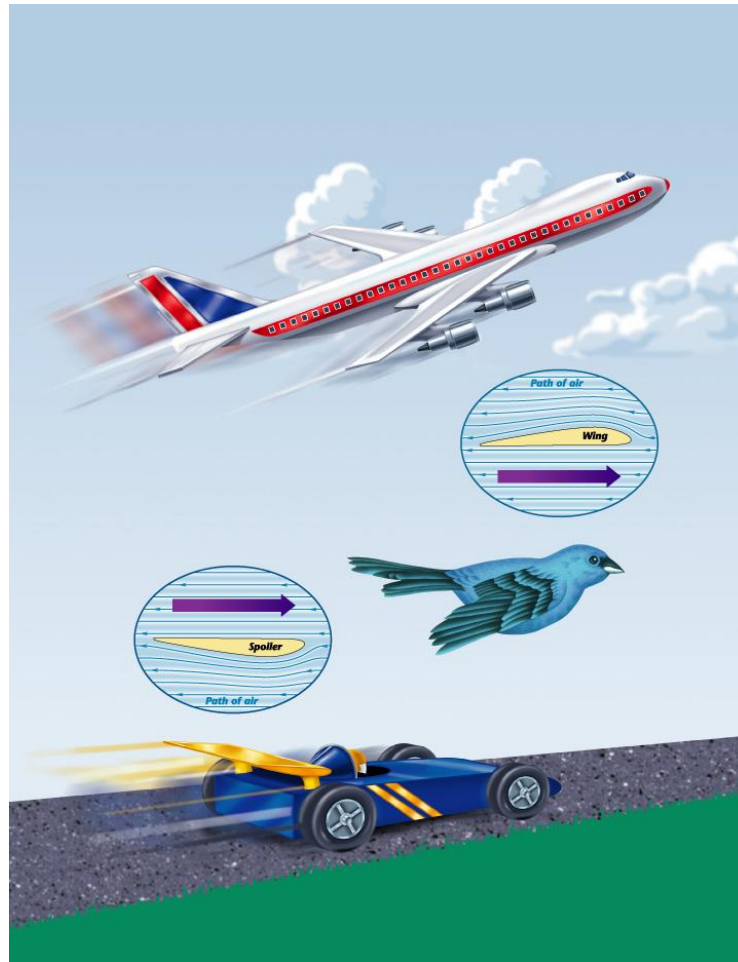
Forces in Fluids



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Forces in Fluids



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