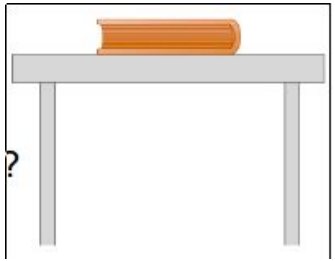
Newton's laws

- Net force 0 → uniform motion (inertia)
- Force → acceleration (d'Alembert's)
- Contact → opposite forces



Gravitational force: const m_A m_B (A-B)/|A-B|^3

what if A = earth and 2nd? → 9.81 m/s^2

Newton's laws

- Net force 0 → uniform motion (inertia)
- Force → acceleration (d'Alembert's)
- Contact → opposite forces

what if box on incline? → normal force, tangential force

Friction: static, kinetic (smoothness)

(tabulated consts)

Fluid drag

$$F_{D_{high}} = -\frac{1}{2} \cdot \rho \cdot v^2 \cdot C_d \cdot A$$

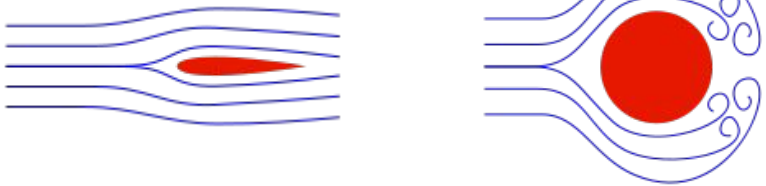
ρ is the density of the fluid (1.204 for air at $20°C$)

→ Reynold's number

C_d is the drag coefficient (depends on the shape of the object).

A is the reference area (area of the projection of the exposed shape).

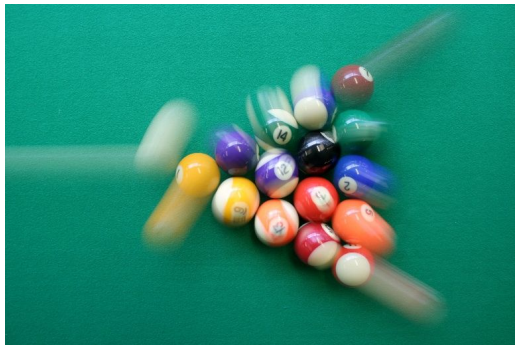
→ buoyancy (density,volume)



Momentum

Momentum = mass vel(ocety) vector

Impulse = *change* of momentum
= integral of force over time
Work = *change* in energy



Work , Energy

work = energy(t+dt)-energy(t)
= force.dx = mass (vel(t+dt)^2-vel(t)^2)/2

- Kinetic energy = mass |vel|^2 unit=Joule, |vel| = speed
- Potential energy = weight*hight

Conservation:

Conservation

Friction → heat

Energy = kinetic+potential+’extra’

Noether’s Theorem:(Newton’s 3rd law)
physical systems with symmetric action have a conservation law