Fluid, density & upthrust

- **Density**

$$\rho_{(kgm^3)} = \frac{m}{V} \frac{(kg)}{(m^3)}$$

- **Upthrust**

- caused by fluid pressure
- upward force = the weight of displaced fluid

$F_{浮} = G_{排}$

$$U = \rho g V$$

Fluid movement

- ## Laminar flow

  same direction. same speed.

  def. layers with no mixing / no adrupt change in velocity

- ## Turbulent flow

  velocity changes over time

  增加 drag → 增加 fuel consuption

  def. layers with mixing / adrupt change in velocity

Viscosity

- η

the frictional force in fluids is due to viscosity

流速与η成正比

单位：$kgm^{-1}s^{-1}$

- **Stoke's law**

condition：小球 } → 层流
慢速 }

$F = 6\pi\eta rV$