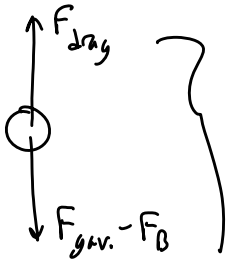
Today, we will:

- Discuss **equations of particle motion** in **Section 8.4**
- Demonstrate some particle trajectory calculations using Mathcad
- Discuss **terminal settling velocity** in **Section 8.5**
- Discuss **the Stokes flow approximation** in **Section 8.5**
- If time, start to discuss **gravimetric settling** in **Section 8.7**

Section 8.4 – Equations of Particle Motion – see pdf on website (copy of this section of the textbook) – I will go over it briefly in class; you need to read the details.

FALLING PARTICLES: Consider particle falling in quiescent air (still air)



when these balance, the particle falls at constant terminal settling speed $= V_t$

↓

Go through analysis (see book)

$$V_t = \sqrt{\frac{4}{3}\frac{(\rho_p - \rho) D_p g C}{\rho C_D}}$$

$$Re = \frac{\rho D_p V_t}{\mu}$$

$C_D = f_{nc}(Re)$

Valid for any regime – not just Stokes flow

If we are in Stokes flow regime, $C_D = \frac{24}{Re}$ → can get a closed-form analytical solution

* SEE MATHCAD PROGRAMS ON 405 WEBSITE