Terminal Velocity Lab Worksheet

Name: ____________________

Date: _____________________

Use this worksheet to predict your terminal velocity in the wind tunnel. During your flight, someone will record your actual terminal velocity. Later, you will compare the two values and see how close your prediction was.

1. Derive the equation for your predicted terminal velocity.

Terminal velocity occurs when the flyer is stable, or when there is no acceleration in either direction. In this case, the force of the flyer's weight equals the force of air drag:

$$F_D = F_W$$

The equation for drag force is $F_D = ½\, v^2 \rho\, C_d A_f$, and the force of weight is $F_W = mg$, where:

v = terminal velocity
C_d = drag coefficient
ρ = air density
A_f = frontal area
m= flyer's mass
g = gravitational acceleration

Substitution yields:

$$½\, v^2 \rho\, C_d A_f = mg$$

Use this space to solve the above equation in terms of terminal velocity, v:

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