Monday Reading Assessment: Unit 5, Forces

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October 11, 2021

1 Memory Bank

- Force of drag, in air or other gas: $F_D = \frac{1}{2} C \rho A v^2$.
- In the above formula, C is an empirical constant, ρ is the density of the air or gas, A is the area of the object, and v is the object's velocity.

Table 5.2 Drag Coefficient Values **Typical values of drag coefficient C.**

Object	C
Airfoil	0.05
Toyota Camry	0.28
Ford Focus	0.32
Honda Civic	0.36
Ferrari Testarossa	0.37
Dodge Ram pickup	0.43
Sphere	0.45
Hummer H2 SUV	0.64
Skydiver (feet first)	0.70
Bicycle	0.90
Skydiver (horizontal)	1.0
Circular flat plate	1.12

Figure 1: A table of drag coefficients, C.

2 Chapter 5 - Drag

1. Suppose a skydiver falling from a plane is oriented horizontally, and that the drag force balances the weight. Draw a free body diagram.

2. Suppose the mass of the skydiver is $m = 65.0$ kg, and $C = 1.0$ (Fig. 1). Also, $\rho = 1.2$ kg/m^3, and $A = 0.5$ m^2. Equate the weight force and the drag force, and solve for the velocity.