Tuesday Reading Assessment: Unit 5, Forces

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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 Toyota Camry and a Honda Civic are street racing. Each has been modified to be capable of speeds of 50 m/s ($\approx$ 180 km/h). (a) Assuming each model has the same cross-sectional area, A, which model experiences a higher drag force? (b) Given that $\rho = 1.2$ kg/m^3, $A = 4.0$ m^2, and $v = 40$ m/s, what is the drag force on each?

2. If the driver of the Honda Civic decreases the speed by a factor of 2 (down to 20 m/s), what is the new drag force?