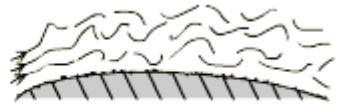
If you have ever put your hand outside the window of a moving car, you have experienced the FORCE of the wind pressure, or what is called DRAG.

Pressure drag is created when a stream of air runs into an object and separates to get around that object. You experience pressure drag when you hold your hand out the window of a moving car with your palm facing into the wind at a 90 degree angle to the road (like the hand signal meaning stop).

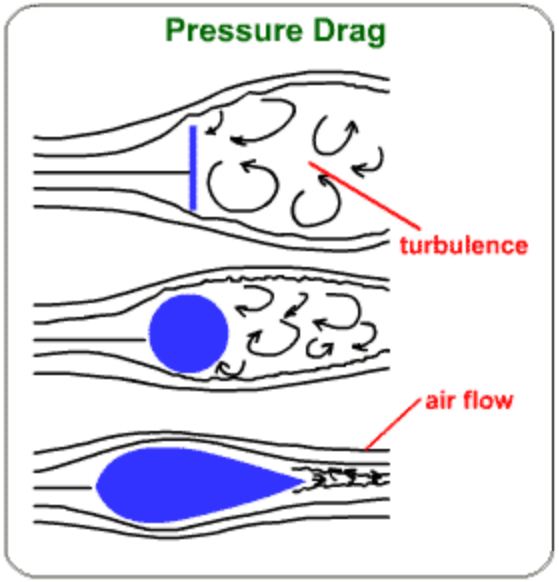
Skin Friction Drag

Skin friction drag is due to friction between air and the surface moving through it. You experience skin friction drag when you hold your hand out the window of a moving car with your palm parallel to the road. Friction on your hand occurs as the air rushes past your hand. The air near your skin tries to pull your hand backward, while at the same time your hand causes the air passing by to slow down.

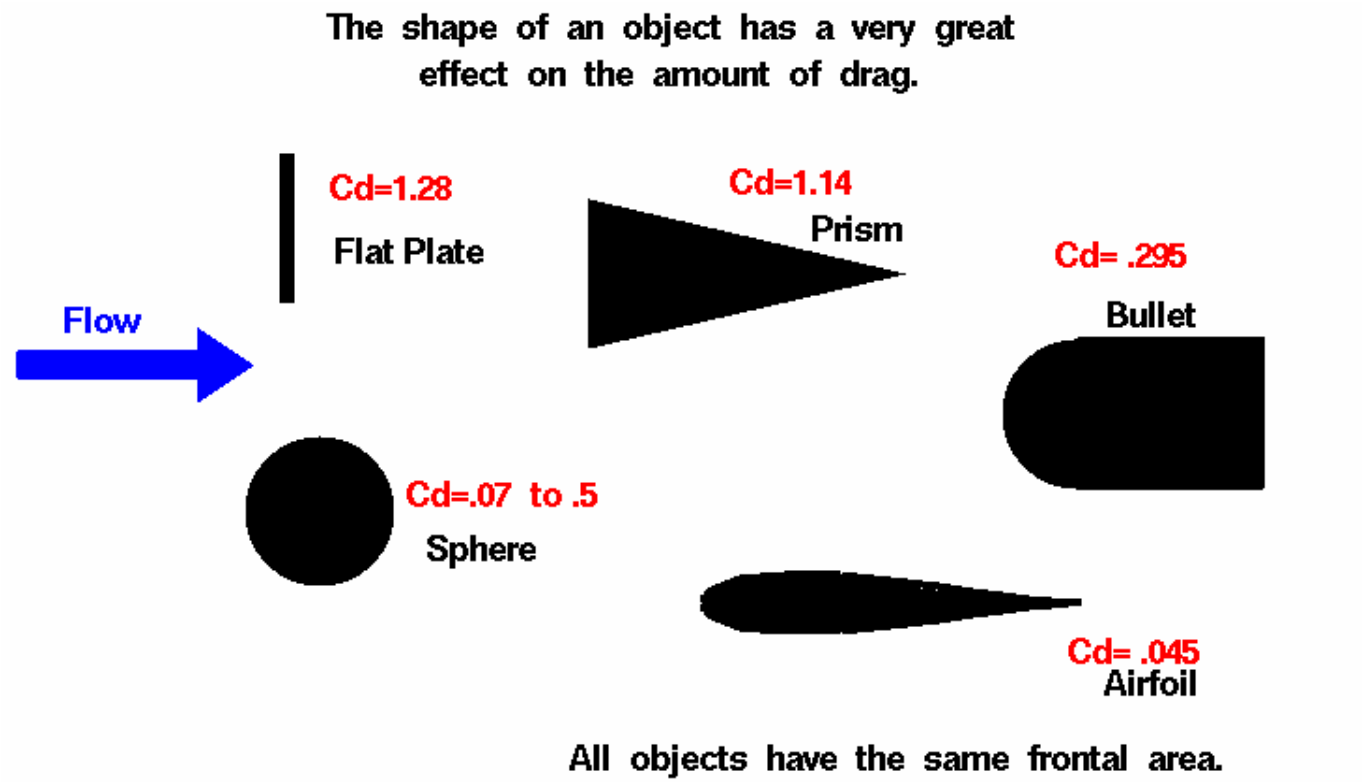
Air Over a Smooth Surface



Air Over a Rough Surface



Cd (Coefficient of Drag)



Let's see if we can think about it, and come up with OUR OWN formula for the force of Drag (wind pressure), shall we? [Next page please]

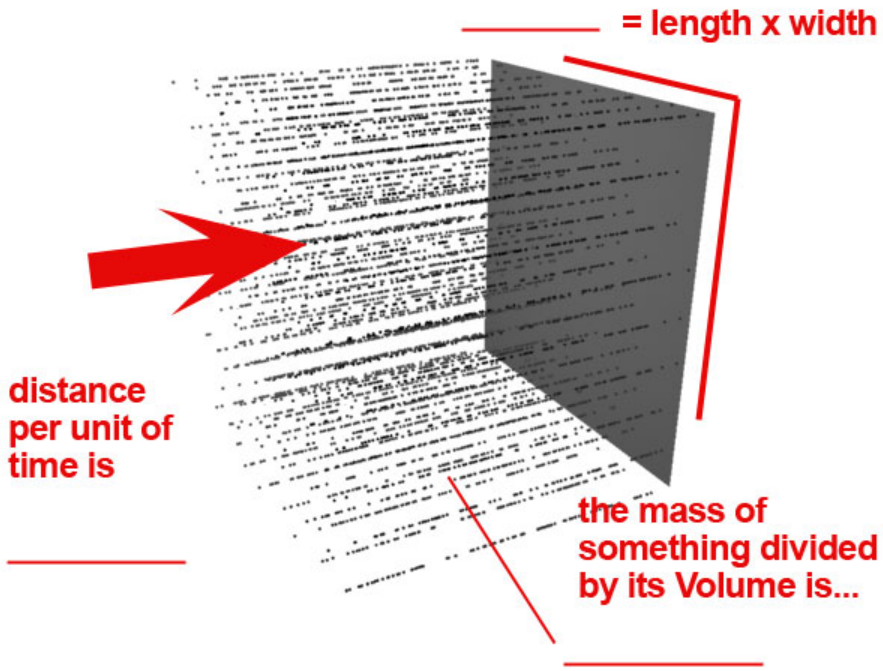
Now look at the picture below: Suppose you could 'see' the particles that make up the wind, and you'll notice that they are traveling very fast (the direction of the red arrow) before they hit something square (say a window pane).

The air particles are actually molecules of Nitrogen, Oxygen and much smaller amounts of other gases. Sometimes, there is also water vapor (the gas form of H_2O).

I want you to think about this, fill in the blanks with the words that describe each part of the picture, and then TRY TO MAKE YOUR OWN FORMULA for wind pressure, otherwise known as the force of Drag.

Here's a HINT: when mathematicians and theorists make formulas, they typically start off by making one that looks like MULTIPLICATION… with several different 'terms' … the words that you'll fill in… so you're formula might look like this…

$Force_{drag}$ = something X something X something … etc.



When you've made up your own formula, EMAIL your answer to me, or ask Your Mom or Dad to email it to me at dherman@stvincentelementary.org ---PLEASE Don't look it up on the Internet, if you do, I'll know it and you will be disqualified. We'll FINISH the formula in its proper form during the next stage of the Challenge!