A7 | **Tahini Amer:** Executive, NASA Headquarters' Science Mission Directorate
Objective: Students will use concepts from geometry such cross sectional area

Do Now: Drag Force

At NASA, Tahini Amer developed instruments to measure the drag force acting on airplanes in wind tunnels. In this Do Now, we will qualitatively examine the drag force. In this do now, determine which of the following cars will have a higher drag force, assuming that all other factors are the same between them.

Factor	*Which has a higher Drag Force?*	
ρ (*Density of Medium*)		
	Car in Water	*Car in Air*
v (*Velocity*)		
	Car driving slow	*Car driving fast*
A (*Cross Sectional Area*)		
	Car with small A	*Car with large A*

Big Idea: Formula for Drag Force

Drag force is proportional to both the density of the medium ρ, and the velocity v and cross section area A of an object. The formula is $D = \frac{1}{2}\rho v^2 C_D A$, where C_D is a constant known as the drag coefficient. Determine the drag on an object traveling with $v = 30$ m/s with a $A = 0.57$ square meters, drag coefficient of 0.24 and the density of air is 1.225 kg/m^3. Simply plug in the given numbers to get $D = \frac{1}{2}(1.225)(30)^2(0.24)(0.57) = 75.411\ N$