AEROSPACE & DEFENSE

LESSON #1 – DRAG | Ashley Howard, M. Ed.

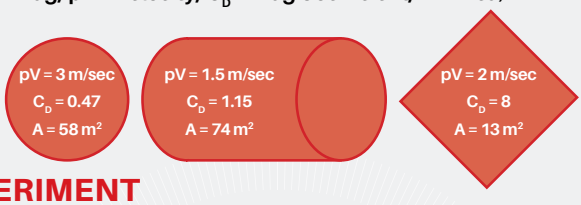
In physics, DRAG is defined as the retarding force acting on a body (such as an airplane) moving through a fluid (such as air) parallel and opposite to the direction of motion.

Drag is influenced by the density, velocity and the area of an object, in addition to the drag coefficient. The drag coefficient is calculated based on the object's shape, density and inclination. To help your students to better understand the concept of drag, have them watch the following youtube video (video length 4:37): **http://bit.ly/2h5mZfE**

STUDENT ACTIVITY

- Ask students to define the following terms: density, velocity, and area.
- Ask students to name each of the components for the drag formula:

  $F_D = 1/2\ pV^2C_DA$ **(F_D = Drag; pV = Velocity; C_D = Drag Coefficient; A = Area)**
- After identifying each part of the drag equation, ask students to calculate drag for the following shapes:



CLASSROOM EXPERIMENT

Supplies: container of playdoh, tall container full of water and toothpicks

Using the playdoh, ask students to create the following shapes:

- **Comparison 1:** a round ball and a flat pancake shape
- **Comparison 2:** a round ball and a round ball (of equal size to ball number 1) with two toothpicks stuck through it to create a cross pattern
- **Comparison 3:** ask students to create a new shape that they think will have even less drag

Complete comparison 1. Ask students to place both playdoh creations at the surface of the water and simultaneously release both the round ball and the flat pancake. Which object made it to the bottom of the tall container first?

Complete comparison 2. Ask students to place both playdoh creations at the surface of the water and simultaneously release both the round ball and the round ball with two toothpicks stuck through it to create a cross pattern. Which object made it to the bottom of the tall container first?

Complete comparison 3. Using what they've learned so far, ask students to create a new shape that they think will have even less drag. Students can compete with one another to see whose object has the least drag.