



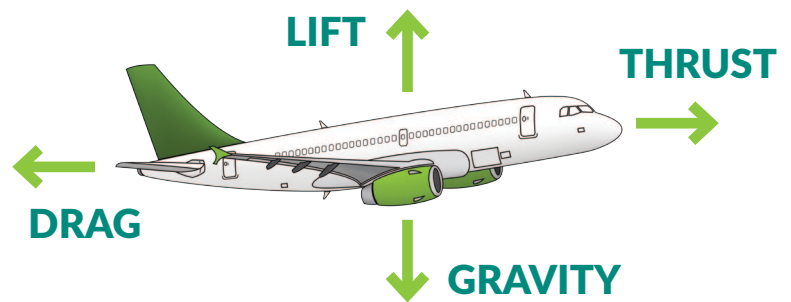
TAKE IT FURTHER

Activity Plus #2: STABILITY AND PRESSURE OPTIONAL ACTIVITY

Background

Daniel Bernoulli, a Swiss scientist in the 1700's, is often considered the father of fluid mechanics and developed a mathematical relationship between pressure and fluid flow. Both liquids and gases are considered fluids and the Bernoulli Principle is a mathematical explanation of why things can fly. The faster a fluid flows, the lower the pressure it has.

Flying objects (and animals) move very quickly relative to their size. Wings, called airfoils when being designed by engineers, are typically rounded on top and flat on the bottom so the pressure on the top of the wing is lower than the pressure of the bottom, creating lift. Lift is a force that is perpendicular to the direction of fluid flow—when air is flowing towards an object, lift is in the upward direction, opposite of gravity.



Planes, cars, bikes and many other objects are used in wind tunnels to test aerodynamics, or how an object moves through air at many speeds. For bikes and cars, we want them to be pushed lower into the ground (no lift), whereas with airplanes we want them to create lift so they can fly through the sky. Wind tunnels can be whole buildings that use powerful fans to test life size objects, or small models, like the one you will build and test today.





Want to know how to build the perfect rocket?

Center of mass and center of pressure are keys to doing just that.

STEM Summary: Flight stability is determined by weight distribution and air pressure exerted on a craft during flight.

STEM Inquiry: Where should the center of pressure be relative to the center of mass? How can the center of pressure and center of mass be changed? What is the relationship between drag and center of pressure? What factors have to be balanced to get a stable flight?

Want to learn how to build your own wind tunnel to test rockets for balance and stability?

Find out from a 4-H leader in Colorado by visiting:

<http://www.apogeerockets.com/downloads/Newsletter252.pdf>

THINK ABOUT IT

- Why might it be desirable for the FTD to fly in the same orientation every time?
- What characteristics does the FTD need to have stable flight?

