

Aerospace Engineering
Gant, Hook, Windes
Lesson: 4-8-2020

Learning Target:

Students will learn about the 4 forces of flight.

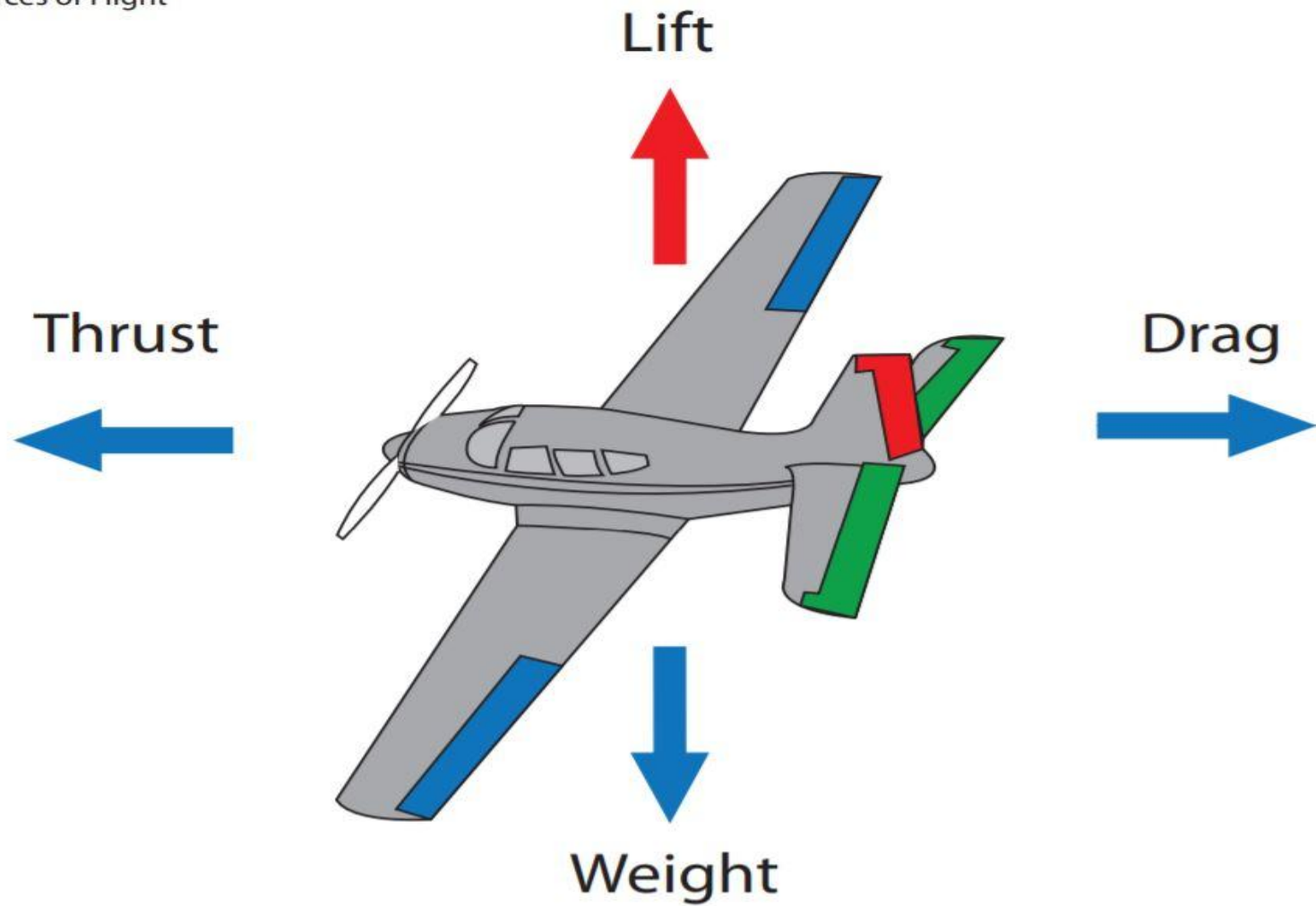
Let's Get Started:

Watch Video: [The Four Forces of Flight](#)

Bell Work:

How do you think the wings of a plane help the plane fly?

Four Forces of Flight



Lift

Lift is the force that directly opposes the weight of an aircraft and keeps the aircraft in the air. The majority of the lift on an aircraft is produced by its wings. The amount of lift produced by a wing will vary depending on the wing's shape and size.

Weight

Weight is the force that is always directed toward the center of the earth because to gravity. The total of the weight is the sum of all the airplane's parts, plus its load, which is the sum of the fuel, people and cargo. While weight is distributed throughout the entire plane, its effect is centered on a single point that is called the center of gravity.

Thrust

Thrust is the force that moves a plane through the air. Thrust is used to overcome the drag of a plane. Thrust is created by the engines of the plane through the propulsion system.

Drag

As a plane moves through the air, it goes against a form of resistance called drag. Every part of a plane affects drag. The amount of drag produced depends on the plane's size and shape. A large plane will produce more drag than a smaller plane.

The Forces in Flight

While each of these forces are completely independent of the other, they work opposite of each other to move the aircraft as controlled by the pilot. When a plane is going in a straight and level, un-accelerated flight the amount of thrust should be equal to the total amount of drag, while the total amount of lift would be equal to the total weight. For the plane to accelerate, the pilot must add thrust to push against the drag and cause the plane to gain speed. To slow down, the pilot will reduce the thrust to less than that of the drag, allowing the drag to slow the plane down.

Forces of Flight Understanding:

1. What are the four forces that allow an airplane to fly?
2. What is thrust and how is it produced?
3. What is lift?
4. What is drag?
5. What is weight?
6. What is gravity?