



# Four Fundamental Forces of Flight

# THRUST

- Thrust is the force applied to an object that accelerates it in one direction. Think of it like a push.
- Thrust is the force that allows the plane to move in its intended direction. This is usually created by an engine or a similar energy source on an aircraft.
- Thrust is not the force that is directly responsible for the plane's flight. The main purpose of thrust is to counteract, or overcome, one of the other four forces of flight, drag.



# DRAG

- Drag is the force that acts in opposition to thrust. It is similar to friction. It moves against the forward motion of the object.
- Friction is caused by surfaces (think of pushing a heavy object across a floor), while drag is caused by air or fluids (think of running into the wind).
- Drag is the interaction between an airplane and the air surrounding it that slows it down.



# WEIGHT

- Weight is the force caused by the gravitational attraction between any object and the Earth. This attraction pulls the object towards the Earth.
- The force weight that is felt on airplanes is the same force that you may feel everyday. When you step on a scale, the number you see is the amount of gravity acting on you.
- Weight on a plane keeps it from floating into space.



# LIFT

- Lift is created by changes in air pressure. This is the force that allows the plane to counteract the force of weight.
- Lift is what causes objects to fly or glide. An example of lift can be seen when you throw a frisbee. The change in air pressure around the frisbee allows it to continue to hover and not just fall directly to the ground.



# Four Fundamental Forces of Flight

Name of Force: \_\_\_\_\_

In your own words, define the force you researched below:

What role does this force play in the fundamentals of flight?

Give a real-life example of this particular force in action and explain your reasoning.

This force accelerates an object in one direction.

Thrust

This force acts in opposition to the force, thrust.

Drag

This force's main purpose is to counteract the force, drag.

Thrust

This force is caused by gravity.

Weight

This force is created by changes in air pressure.

Thrust

This force is usually created by an engine or similar energy source on an aircraft.

Thrust

This force acts similarly to friction.

Drag

This force acts similarly to a push.

Thrust

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Running into the wind or trying to push a heavy object across the floor is a good analogy for this force.

Drag

This force keeps everything from floating into space.

Weight



This force is felt by everyone on Earth everyday.

Weight

A good way to demonstrate that this force is working is by throwing a frisbee.

Lift

This force, when it works with three other forces, leads to lift off from the ground.

Thrust

This force directly counteracts the force of weight.

Lift

This force is very similar to friction, but focuses on air rather than physical objects.

Drag