## How Does An Airplane Fly ?

Although technology has grown by leaps and bounds since the days of [Orville and Wilbur Wright](https://www.wonderopolis.org/wonder/who-were-the-wright-brothers" \t "https://www.wonderopolis.org/wonder/_blank), the science behind [flight](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) has stayed the same. For an airplane to take [flight](https://www.wonderopolis.org/wonder/how-do-airplanes-fly), two special forces are required: thrust and lift.

Thrust is forward [motion](https://www.wonderopolis.org/wonder/how-do-airplanes-fly), and in an airplane it's provided by either a propeller or a jet engine. [Sufficient](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) thrust must be generated to overcome the opposing force of drag, which results from the [friction](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) that is created by the airplane moving through the air.

To better understand the force of drag, you can conduct a simple experiment the next time you're riding in a car. Stick your [hand](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) out the window to feel the air rushing past. When you put your [hand](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) up like you're giving your friend a [high five](https://www.wonderopolis.org/wonder/who-invented-the-high-five" \t "https://www.wonderopolis.org/wonder/_blank), you can feel a [significant](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) amount of force from the air pushing against your [hand](https://www.wonderopolis.org/wonder/how-do-airplanes-fly). That's drag.

If you put your [hand](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) palm down, though, the force of drag is greatly reduced. That's why airplanes are shaped like they are, so that their form is as [aerodynamic](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) as possible in order to reduce drag and maximize the amount of thrust provided by the propellers or jet engines. For an airplane to take [flight](https://www.wonderopolis.org/wonder/how-do-airplanes-fly), thrust must be equal to or greater than drag.

The other key force necessary for [flight](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) is lift. Lift is created by the special shape of an airplane's wing, which is also known as an airfoil. Airplane wings are shaped and tilted in such a way that, when air moves across the wings, an upward force is created on the wings. The force of lift will lift an airplane into the [sky](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) when it becomes greater than the opposing force of [gravity](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) pulling the airplane toward the ground.

Experts still argue about exactly how the force of lift is created. Some believe that lift is explained by Bernoulli's principle (named after Swiss mathematician and scientist Daniel Bernoulli), which holds that the faster-moving air above the wing has lower pressure than the slower-moving air beneath the wing. Thus, the greater pressure below the wing pushes the airplane upward, creating lift.

Others believe that lift can be explained by Newton's laws. This [explanation](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) holds that the air moving over the wing gets deflected downward by the wing's angle. Since Newton's laws state that this reaction must be met by an equal and opposite reaction, lift is thus created on the underside of the wing.

Regardless of which theory best explains lift, it's clear that lift must exceed [gravity](https://www.wonderopolis.org/wonder/how-do-airplanes-fly) for an airplane to leave the ground. This means that an airplane will have to generate more lift the heavier it is. Likewise, the lighter an airplane is, the less lift that is required.