

WHAT MAKES AN AIRPLANE FLY? *

Aerodynamics

What makes a paper airplane fly? Air—the stuff that is all around you. Hold your hand in front of your body with your palm facing sideways so that your thumb is on top and your pinkie is facing the floor. Swing your hand back and forth. Do you feel the air? Now turn your palm so it is parallel to the ground and swing it back and forth again, as if you are slicing through the air. You can still feel the air, but your hand is able to move through it more smoothly than when your hand was turned up at a right angle.

How easily an airplane moves through the air, or its aerodynamics, is the first consideration in making an airplane fly a long distance.

Drag and Gravity

Planes that push a lot of air, like your hand did when your palm was facing to the side, are said to have a lot of “drag,” or resistance, when moving through the air. If you want your plane to fly as far as possible, you want it to have minimal drag.

A second force that planes need to overcome is gravity. You need to keep your plane’s weight to a minimum to help fight against gravity’s pull to the ground.

Thrust and Lift

Thrust and lift are two other forces that help your plane make a long flight. “Thrust” is the forward movement of the plane. The initial thrust comes from the muscles of the “pilot” as the paper airplane is launched. After the launch, paper airplanes are really just gliders, converting altitude to forward motion.

Lift occurs when the air below the airplane wing is pushing up harder than the air above it is pushing down. It is this difference in pressure that enables the plane to fly. Pressure can be reduced on a wing’s surface by making the air move over it more quickly. The wings of a plane are curved so the air moves more quickly over the top of the wing, resulting in an upward push, or lift, of the wing.

The Four Forces in Balance

Long flights come when these four forces—drag, gravity, thrust, and lift—are balanced. Some planes (like darts) are meant to be thrown with a lot of force. Because darts do not have a lot of drag and lift, they depend on extra thrust to overcome gravity. Long-distance fliers are often built with this same design. Planes that are built to spend a long time in the air usually have a lot of lift but little thrust. These planes fly a slow and gentle flight.

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