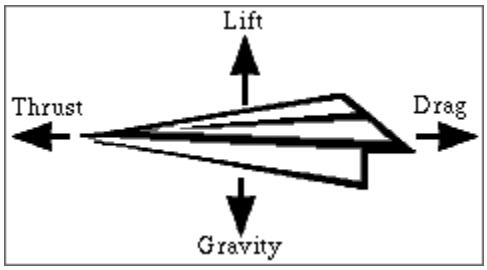
What Makes Paper Airplanes Fly?

Aerodynamics

What makes a paper airplane fly? Air — the stuff that's 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, like you're slicing it 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 for a long distance.

Drag & Gravity

Planes that push a lot of air, like your hand did when it was facing the side, are said to have a lot of "drag," or resistance, to moving through the air. If you want your plane to fly as far as possible, you want a plane with as little drag as possible. 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 & 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 this, paper airplanes are really gliders, converting altitude to forward motion.

Lift comes 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 that the air moves more quickly over the top of the wing, resulting in an upward push, or lift, on 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 don't 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.

From: *http://teacher.scholastic.com/paperairplane/airplane.htm*

How Does a Paper Airplane Fly?

By Keith Evans, eHow Contributor

A Paper Airplane is Designed with Wings

1. When a paper airplane is designed, the builder folds the sheet of paper to provide maximum wingspan to support the plane for prolonged flight. As with general aviation, paper airplanes may be designed with different wing configurations for speed or lofty, prolonged flight. In addition, some designers choose to add a small weight to the plane to keep it stable in flight.

The Plane Receives Thrust From the Thrower

2. For any airplane to fly, it must have both thrust and lift. The wings provide lift for the airplane as described in Section 3 below, but the thrust must originate from outside the plane. As with any other form of aviation, the plane's lift overcomes the force of gravity and the plane's thrust must be enough to overcome the laws of inertia. When the paper airplane is thrown, it is thrown with enough force to overcome its tendency to remain still. Some people prefer to throw the plane at a slight upward angle to maximize the amount of time the plane moves forward (using thrust to move slightly upwards and gravity to continue moving). The angle at which the plane should be thrown is dependent on the plane's design.

Wings Carry the Plane Through the Air

3. As the plane moves forward, its wings cut through the air to generate a small amount of lift. As the air rapidly flows over and under the paper wing, a tiny vacuum is formed over the top of the wing to hold the plane aloft. As the forward motion diminishes, the airflow over the paper wing slows and the lift is reduced. As the thrust and lift subside, a properly designed paper airplane should glide to a safe landing.

From: *http://www.ehow.com/how-does_4567589_paper-airplane-fly.html*

Fun Facts About Paper Airplanes

By Mary Flinn, eHow Contributor

Paper airplanes have fascinated children and adults alike around the globe for generations. A simple toy to some, an aeronautics research tool to others, paper airplanes can be folded into a variety of designs, from basic darts and gliders to intricate stunt planes and World War II airplanes. Turning paper into a flying machine may seem simple, but paper airplanes use the same principles of flight as airplanes. Whether they are made to set a world record or design a better airplane, paper airplanes can be educational, interesting and fun.

Inventor

1. The invention of the paper airplane is mystery, but Leonardo Di Vinci is often given credit for the feat.

Fun Fact

2. According to the Paper Aircraft Association, a paper airplane thrown in space will not fly; it will float in a straight line. Unless it hits an object, it could literally float forever (see Resources).

Wingspan

3. The record wingspan of a paper airplane is 40 feet and 10 inches. The craft flew over 114 feet before crashing into a wall.

Education

4. Scientists, engineers and students use paper airplanes to study aerodynamics. The National Aeronautics and Space Administration (NASA) sent a paper airplane to space on a space shuttle.

Shapes

5. Paper airplanes can be made in many shapes. According to world record holder Ken Blackburn, airplanes in the shape of an "X," a hoop and a "futuristic spacecraft" can all be made to fly (see Resources).

Weather

6. The humidity outside can affect the performance of a paper airplane thrown inside.

From: *http://www.ehow.com/facts_4967620_fun-facts-paper-airplanes.html*