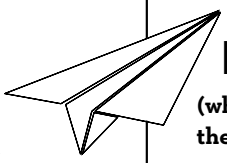
THE SCIENCE OF **FLYING**

National Aeronautics and Space Administration



In order to fly, you should aim for a general goal of

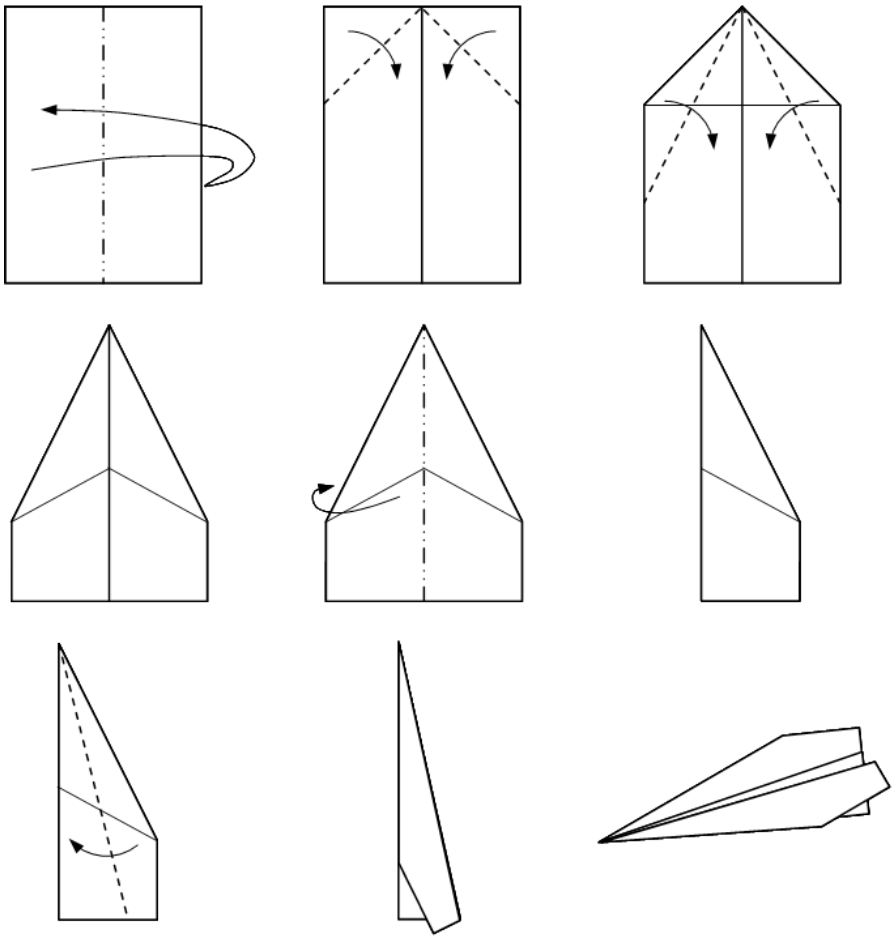
Lift + Thrust > Gravity + Drag

(where the combination of lift and thrust are greater than the combination of gravity plus drag on your plane)

While kids might like to make paper airplanes, it's much more than child's play. There is a lot of science and engineering that goes into making a successful paper airplane. For example, you need to know about what forces – that is, pushes and pulls – act on your airplane. When you push a paper airplane forward (or any airplane for that matter), this is a type of force known as **thrust**. Meanwhile, air is pushing back on the plane, which is called **drag**. While a plane is flying, air moving over and under the wings pushing it upward, while the **gravity** from the Earth pulls it down. All of these forces (**thrust, lift, drag and gravity**) affect how well a given paper plane's flight will go.

There are other factors that determine how far and high your paper airplane will go: its construction material (type of paper), angle of lift off (how you push it off), and even the atmospheric conditions (the weather).

Experiment with these different aspects of flying a paper airplane, and most importantly, have fun!



Please note: Be safe, never throw your paper plane at a person or animal.

TIPS FOR MAKING YOUR BEST PAPER AIRPLANE

Test how far your airplane flies using the same distance markers every time. Each time you launch your plane, try to throw it with the same amount of "oomph" (a nontechnical term for "force").

Make paper airplanes that are different sizes and compare how well they fly. Do bigger planes fly farther or not?

Try making paper planes out of different types of paper, such as printer paper, construction paper and newspaper. What happens?

Come up with your own designs and find out what results you get!