



Curiosity Guide #508

Paper Airplanes

Accompanies Curious Crew, Season 5, Episode 8 (#508)

Steerable Planes

Investigation #6

Description

Have some flapping good fun investigating how to steer your plane!

Materials

- 5 pieces of 8 $\frac{1}{2}$ by 11-inch, lightweight paper
- Scissors
- https://www.grc.nasa.gov/WWW/K-12/Summer_Training/Elementary97/dart.html
- A friend

Procedure

- 1) Begin by making five typical Dart paper airplanes, such as the one provided by NASA, listed in the Materials section.
- 2) On four of the airplanes, cut a small slit, 1 inch in length, along the top of each wing, from the center fuselage toward the nose.
- 3) On each of the four airplanes, fold the flaps in a different configuration:
 - a. Left up, Right down
 - b. Right up, Left down
 - c. Both down
 - d. Both up
- 4) Leave the fifth plane without any cuts or tail folds.
- 5) Have a friend predict where each plane will land when you throw it.

- 6) Throw each plane.
- 7) Record the results of each flight.
- 8) What did you notice?

My Results

Explanation

The flaps on the tail of the paper plane serve the same purpose as the elevators on the tails of airplanes do. Raising or trimming up an elevator creates more drag from air particles that collide with the elevator, and the nose of the plane lifts up. The opposite is also true. Trimming the flaps down causes more drag on the underside of the plane, and the nose of the plane drops. Bending one flap up and one down is similar to how a pilot changes the ailerons on the wings. To turn right, the right flap goes up and the left goes down. When turning or banking to the left, the left aileron goes up and the right goes down.

Talk the talk. Tail flaps are elevators. Raising the elevators is called trimming up. Lowering the elevators is called trimming down. Ailerons are flaps on the wings of airplanes that also control direction, especially when the plane needs to turn. Turning the plane is also called banking.

Think about this. Have you ever held your hand out of an open car window while driving down the street? If you have, you got to feel the air resistance or drag, similar to what a plane experiences flying in the air.

You can even feel a change in that drag! Try holding your hand flat into the wind with your thumb facing up; then rotate your hand forward so your thumb is in front, slicing through the air. You might notice that holding your hand flat is easier. This is because your hand is much thinner and can cut through the air, deflecting those tiny air particles out of the way. Dart airplanes are thin like your hand and have less drag, too. Cool!

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