



Curiosity Guide #508

Paper Airplanes

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

Boomerang Airplane

Investigation #1

Description

Find out how to adjust a typical paper airplane to turn it into a boomerang plane.

Materials

- 8 $\frac{1}{2}$ by 11-inch piece of paper
- Scissors
- A friend

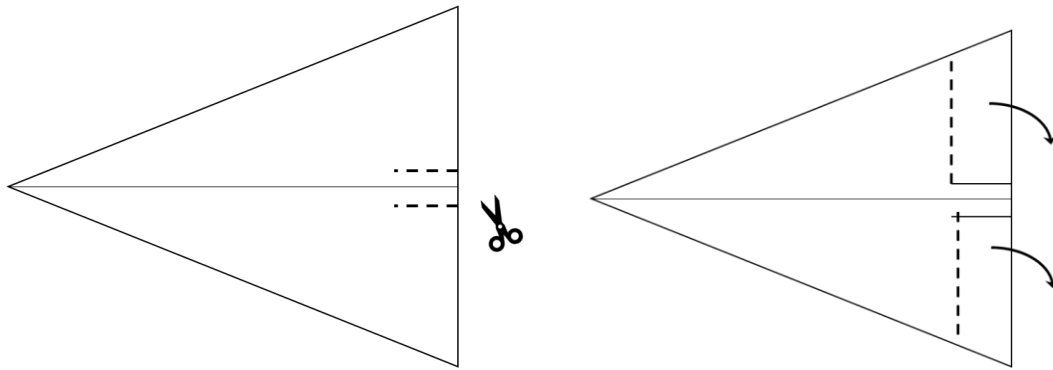
Resources

- Typical Dart paper airplane provided by NASA
https://www.grc.nasa.gov/WWW/K-12/Summer_Training/Elementary97/dart.html
- Boomerang 1 from John M. Collins, the Paper Airplane Guy
<https://youtu.be/5pKicjvC6Uo>

Procedure

- 1) Begin by making a typical Dart paper airplane, such as the one provided by NASA.
- 2) Have a friend predict where the plane will land when you throw it.
- 3) Throw the plane.
- 4) What did you notice?

- 6) Use the scissors to cut a small slit 1 inch in length along the top of each wing from the center fuselage toward the nose of the plane.
- 7) Fold the flaps down toward the ground.
- 8) Have a friend predict where the plane will land when you throw it.
- 9) Throw the plane.
- 10) 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 tail of airplanes. When the elevator is trimmed or pointed up, it creates more drag from air particles colliding with the flap and results in the nose of the plane lifting up. The opposite is also true. If the flaps are trimmed or pointed down, there is more drag on the underside of the plane, and this causes the nose to drop. By bending down the flaps on the paper airplane and throwing the plane hard up into the air, the drag causes the nose to angle down and turns the plane upside down. Now the top side of the wing is underneath, and the elevators are facing up. This lifts the plane once again. With practice you can throw the plane so that it comes back and you can catch it. There are other great boomerang plane designs, like John M. Collins' Boomerang One that can bank or loop with an adjustment of the elevators.

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