

A STEM in the Park

Take Home Activity

STEM

in the **PARK**™

Science, Technology, Engineering, and Mathematics



Forces in Flight:

How Does an Airplane Fly?

Airplanes can weigh nearly 200 tons, so how do they ever get off the ground? Keep in mind that:

- Rushing air hits the bottom of the wing and pushes it up while being deflected downward.
- Air also travels over the top of the wing. It follows the top surface smoothly all the way to the back of the wing, and the shape of the wing causes this air to move downward off the back of the wing.
- All this air pulled downward by the wing, causes the wing to be pulled upward.

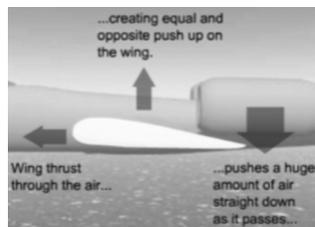
When airplanes fly, four main forces are at work. These four **forces are thrust, drag, lift, and weight.**

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All of the things that fly stay up because they are pushing a LOT of air down—tons of air every second for a small plane. This push DOWN on air is balanced by an equal and opposite push UP on the wings—enough to keep the flying object from falling. When a jet engine is running, the engine pushes hot gases out the back with tremendous force. The opposite reaction is that the plane moves forward. The stronger the thrust backward, the faster the plane moves forward!

What You Need

- Paper clips (6-8)
- Scissors
- Notebook paper (2" x 10")



What To Do

Demonstrate that rushing air over the top of the wing sticks close to the wing.

1. Cut a strip of paper - 2" x 10". Hold one end against your chin, below your mouth.
2. Blow over the top of the strip. As the air tries to stay close to the paper, it pulls the paper up. The paper should rise.
3. Attach a paper clip to the end of the strip and repeat step 2.
4. Add more paper clips to see how many you can lift.

Just as the air moving over the top of the wing helps keep a plane in the sky, blowing on the paper causes it to rise. The moving air near the top of the paper stays close to the paper, and so gets pulled down by the curved paper. This pull down on the air (action) is balanced by a pull up on the paper (reaction)—the paper rises up.

What happens to the paper when you stop blowing?

K12 CURRICULUM LESSON: Grade 4, Unit 4 lesson 2

***This activity is brought to you by
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