

**GRADES****5-7****Materials:**Activities

Model Airplane  
Colorful Letter-Size Paper  
Sticky Notes  
One Fan

Worksheets

You're a Pushover

**Key Terms:**

Aerodynamics, Planes,  
Forces, Thrust, Drag, Lift  
Weight, Engine, Newton's  
third law of motion

**Flight in Motion 2****Objective:**

Students will learn about Newton's third law of motion and explain how four key forces (Thrust, Drag, Lift, Weight) act on airplanes during flight.

**Activity Overview:**

Start by demonstrating Newton's third law of motion through the *You're a Pushover* activity. Students then build their own paper planes and learn about the forces act on airplanes in the air. They will then be instructed how to modify the four forces.

**Activities:**

1. Warm-Up
  - Ask the students if they have wondered how airplanes stay in the air; and whether they have made and flown a paper airplane before.
  - Explain Newton's third law of motion "For every action there is an equal and opposite reaction."
  - You're a Pushover Activity: Direct the students to push on the wall as hard as they can. Watch how students brace themselves before pushing. Ask students to observe and described what happened. Then repeat this activity, except this time, students stand up right and flat footed, close to the wall. Complete the Worksheet.
  - Demonstrate and introduce students to the flight terms: Thrust, Drag, Lift and Weight.
2. Build the Planes
  - Each student is given a wooden airplane. They start to build their own based on the instructions provided.
  - Use the airplanes students just built to describe how four key forces act on airplanes during flight.
3. Modify four forces of flight
  - Students work in a small group of 4-5. Have students place their feet on the line and throw the paper plane, about five times to see how far they go.
  - Have the students modify Thrust by throwing the airplane with low, medium and strong forces allowing it to fly slowly to fast.
  - Have students modify Drag by flying the plane into the wind in front of the fan. Alternatively, have them imagine if the plane is flown underwater, whether they it will fly that far (modify drag).
  - Have the students modify Weight by taping paper clips near the center of gravity.
  - Have students modify Lift by taping sticky notes to create flaps.
4. Review: Voting – Asking True/False questions