

**GRADES 4-8****Materials:**Museum

Model Airplane  
 Balloons (1 per student)  
 Two Stopwatch/phone  
 One Umbrella  
 One Fan  
 Two Balls  
 Two sheets of paper

Worksheets

Thrust & Time

**Key Terms:**

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

**Flight in Motion 2 – Four Forces of Flight****Objective:**

Students will learn how four key forces (Thrust, Drag, Lift, Weight) act on airplanes during flight.

**Activity Overview:**

Students take turn visit four stations in groups to learn and demonstrate four forces. Then, they will be instructed to relate the four forces and apply them on airplanes.

**Activities:**

Dividing the space into four stations: Thrust, Drag, Lift and Weight.

1. Station 1: Thrust
  - Materials: Balloons; One stopwatch/phone; Worksheets
  - Have each student inflate the balloon. Students take turn let go of the balloon while another times the length of the flight. Repeat the experiment with different levels of inflation (15, 10, 5 times of breath).
2. Station 2: Drag
  - Materials: One umbrella; Stopwatch/phone
  - Have one student run from one to another point (assigned) while another times the journey. Have the same student run again holding the open umbrella behind them. Again, time the journey.
3. Station 3: Lift
  - Material: One fan
  - Have each student hold one hand flat against the blowing stream of air. Have them tilt the front of their hand slightly. They should feel it starts to rise.
4. Station 4: Weight
  - Materials: Two balls of similar size but different weights & two sheets of paper.
  - Have one student stand on the table/chair holding the two balls at arm's length and at equal height. Ask the students which ball will fit the ground first. Have the student holding the balls drop while other students watch. Repeat until students accept that both balls hit the ground at the same time.
  - Take two sheets of identical paper and scrunch one into a tight ball. Before repeat the dropping experiment, ask students which one will land first.
5. Four forces of flight
  - Use the model airplane and demonstrate four forces of flight.
6. Review

Supported by Hoi Ko  
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References:

[https://www.hq.nasa.gov/office/aero/pdf/four\\_forces\\_5\\_8.pdf](https://www.hq.nasa.gov/office/aero/pdf/four_forces_5_8.pdf)