



PLTW Flight and Space Virtual Learning

8th Grade/Ailerons

May 13, 2020



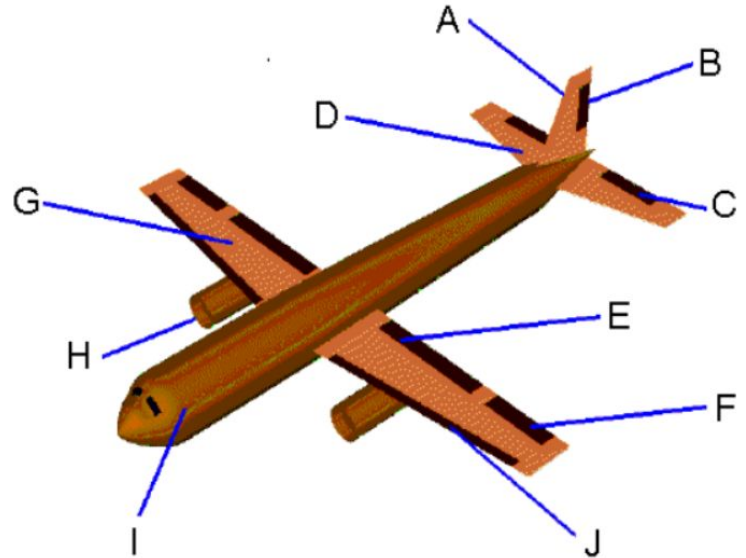
8th Grade/Flight and Space
Lesson: May 13, 2020
Day 1 of 2

Objective/Learning Target:
Students will learn about the effects of ailerons on flight.

Warm-Ups:

Sketch and label the diagram on your [Cornell Notes](#) or notebook paper.

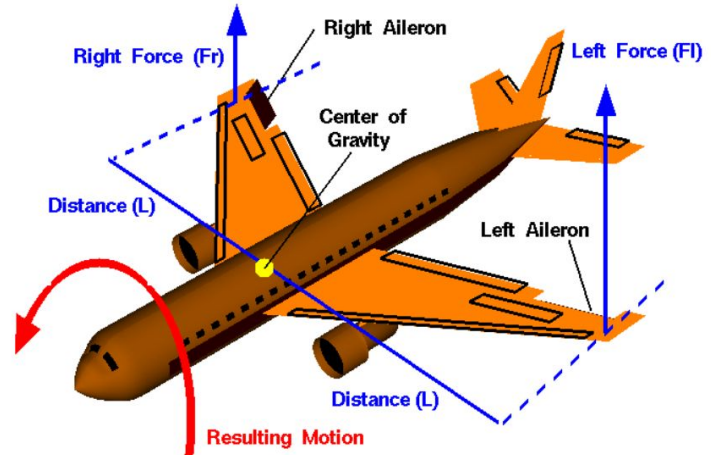
Cockpit
Slats
Elevator
Vertical Stabilizer
Wing
Spoiler
Rudder
Flaps
Fuselage
Jet Engine
Horizontal Stabilizer
Aileron



Lesson Introduction/Background Information:

Ailerons can be used to generate a rolling motion for an aircraft. **Ailerons** are small hinged sections on the outboard portion of a wing. Ailerons usually work in opposition: as the right aileron is deflected upward, the left is deflected downward, and vice versa. The ailerons are used to bank the aircraft; to cause one wing tip to move up and the other wing tip to move down. The banking causes the aircraft's flight path to curve. (Airplanes turn because of banking created by the ailerons, not because of a rudder input.)


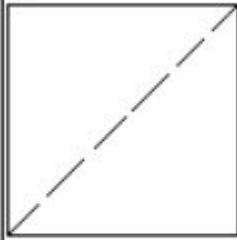
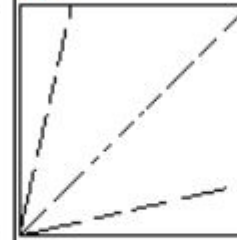
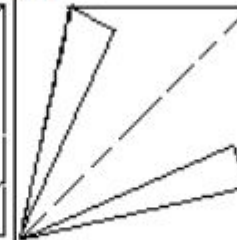
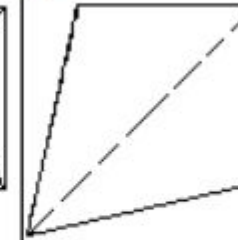
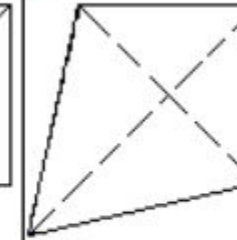
In the diagram, the left aileron is angled down and the right aileron is angled up. This causes a greater lift effect on the left wing rolling the airplane to the right.



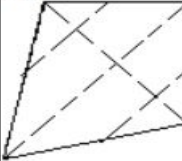
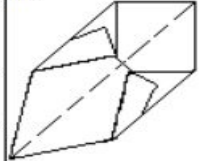
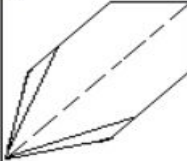
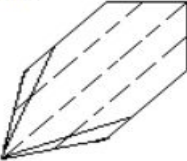
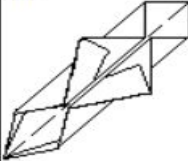
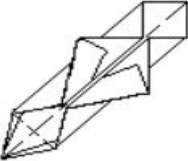
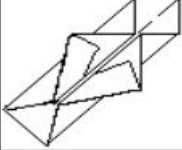
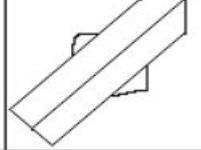

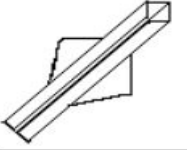
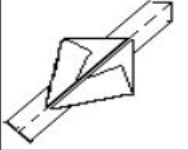


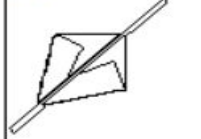
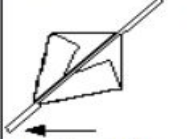
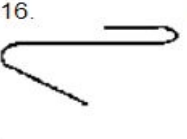
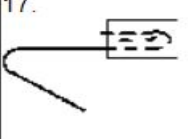
Practice:

You will be testing the effects of ailerons on flight by making and modifying a paper airplane.

Follow the steps to make your Jet model paper airplane. You can also find the steps on the NASA site [here](#). In the next lesson you will modify the plane so see the effects of the ailerons.

How to build a paper JET model					
1.	2.	3a.	3b.	4.	5.
					
1. Begin with a square piece of paper.	2. Fold the square along a diagonal and then unfold.	3. Fold the paper in as shown in the diagram.		4. Flip over	5. Fold the paper between the two corners and unfold.

Practice:

6a. 	6b. 	7. 	8a. 	8b. 	9a. 
6. Fold those corners toward the center along the crease you just made.		7. Flip over.	8. Fold the sides into the center, but don't fold the flaps from the bottom.		9. Fold in the pointed end as shown.
9b. 	10. 	11a. 	11b. 	12. 	13. 
	10. Flip over	11. Fold sides toward the center.		12. Flip over.	13. Fold sides under the flaps towards the center.
14a. 	14b. 	15. 	16. 	17. 	
14. Push down the sides so they meet under the flaps and look like a normal paper airplane's fuselage. (at right angles with the wings)		15. Staple the front of the paper airplane (where the arrow is pointing)		16. Bend a paper clip so that it makes an "S".	17. Thread the paper clip through the hole

Self-Assessment:

Have you ever made a paper airplane like this one before?

Did you have any trouble following the directions?

Extend Your Learning/Continued Practice:

Learn more about Aircraft Control Surfaces.

See how the movement on the ailerons changes lift.

Primary Flight Controls

