Catch Some Air

Grade Level
5 - 7

Activity Type
Hands-on building and testing

Duration
1 hour
30 minutes the following morning

Scheduled Time
Monday, 2:15 - 3:15
Tuesday, 9:15 - 9:45

Content Overview
Two important parts of an airplane that help to control it are ailerons and elevators. Ailerons are located on the outer edge of the airplane's wings. They move in opposite direction, so when one is up, the other is down – this allows the airplane to roll (the side to side motion). Elevators are on the horizontal tail section and control pitch – the up and down motion of the airplane. Adjusting these controls, even a small amount, can increase (or decrease) the stability of the aircraft and allows for better-controlled flight.

Essential Question
How do the parts of an airplane help it to remain in flight?

Objectives
Campers will be able to:
- ✧ Construct a cardboard glider.
- ✧ Manipulate the glider parts for better flight.

Materials
Per camper:
- ✧ A copy of the two glider pages printed on card stock
- ✧ Scissors
- ✧ Glue stick
- ✧ Paper clips or plasticine (optional)

Per class:
- ✧ Several stopwatches

Preparation & Management
1. Ask campers what they know about airplanes. Use the Content Overview and Glossary to give campers even more information about gliders. (Optional: Use a large K-W-L chart to gather this information. See the K-W-L section in the Background Information of this guide.) Ask campers what makes airplanes fly? What helps control an airplane?

2. Copy glider pages (1 set per camper) on to card stock.

3. Make sure that campers do NOT cut the elevators or ailerons until you tell them to do so.

4. Allow the plane to dry completely.

5. Have campers try a test flight. If the plane nosedives, tell the campers to cut ONLY the small black lines on each tail fin. Then have them fold the elevator upwards. If the airplane rolls tell them to cut the lines on each wing and bend the ailerons up or down to control the roll.

6. Paper clips or plasticine can be added to the nose of the plane to help it fly.

Tuesday Morning Fly-In:

1. Designate an area of the room which is long and straight as the fly-in area. Place a tape measure, or mark off the distance, along the length of this space.

2. Tell campers to make adjustments to their gliders.

3. Allow each camper three test flights of their gliders. Tell them that you are looking for gliders that go the furthest and travel in a straight line.

4. Give each camper three test flights. Mark the results of each flight on your Counselor Data Sheet. The column on the right is for recording the test flights.

5. You may also want to add a second component to this activity: Which glider remains airborne the longest?

6. After completion of the activity, finish the K-W-L chart. Make sure the following topic(s) have been discussed:
   - ✧ Ailerons help to control roll.
   - ✧ Elevators help to control pitch.

Counselor Data Sheet

CAMPER NAME	DISTANCE TRAVELLED (inches or centimeters)		
	Test 1	Test 2	Test 3

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Task Card 1

CUT ONLY ON SOLID BLACK LINES. FOLD ON DOTTED LINES.

1. Use scissors to cut out the glider pieces.
2. Line up the pieces of the fuselage (pieces 1 - 5) in order. Number 1 at the far left, number 2 next, and number 5 at the far right. (See note.)
3. Glue each of the pieces of the fuselage to the piece that is next to it.
4. Bend down the rectangular sections that are found on pieces 1 and 5, as shown in Figure 1. (There are a total of four of these sections.)
5. Glue piece 7 to the bottom of piece 6.
6. Glue the wing to the top of the front rectangular sections of the fuselage. (See note.)
7. Glue the two tail pieces to the back two rectangular sections. (See note.)
8. Allow the glue to dry.

NOTE: The airplane picture on each piece shows the direction that the piece faces. The front of the airplane picture is at the front of that glider piece. Make sure that all of your pieces face the correct direction.

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Task Card 2

THE NEXT MORNING

9. Test your glider.
10. Camber the wings by using your fingers to give the top of the wings a rounded shape. (See Figure 2.)
11. Cut the lines next to the sections labeled: elevators and ailerons. (See Figure 3.)
12. Bend along the dotted lines to adjust the glider's flight. Elevators help with pitch (nose up or down). Ailerons help control roll.
13. Test the glider again.
14. You will have the opportunity to fly your glider 3 times during the Fly-in. It will be measured for distance. It will also be observed for the straightness of its path.

BONUS: Launch your airplane by placing a rubber band in the notch at the bottom of the fuselage. To do this, cut out the triangle at the bottom of the fuselage. Put one end of the rubber band in this notch. Hold the rubber band with one hand and pull back the airplane with the other. Once the rubber band is taut, release the airplane.

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Task Card 3

Figure 1

Figure 2

Figure 3

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Record your data from your flight test in the spaces below.

TEST FLIGHT	DISTANCE TRAVELLED (inches or centimeters)
1	
2	
3	

Record your observations, or changes that you would like to make to your glider, in the space below.

What adjustments to your glider helped the most?

COMPLETED BY: _____ SIGNATURE: _____ DATE: _____