The "Art of Fine Play"

THE FPG-9

Play has been defined as the work of children and, as such, toys are the tools of their work. If play is the work of children, the "art of fine play," (fun with a purpose) is the work of teachers. Orville and Wilbur Wright first learned about flight when their father brought home a toy helicopter for their amusement Orville recalled that they played with it for hours, eventually designing and modifying the original many times.

The FPG-9 derives its name from its origins, the venerable and ubiquitous foam picnic plate. The Foam Plate Glider, is created from a 9-inch diameter plate, available in most grocery and convenience stores. It can be used for an engaging and safe exploratory activity to excite students and deepen their understanding about science and the physics of flight. The activity introduces concepts about air pressure, drag and how aircraft use control surfaces to climb, turn and maintain stable flight.

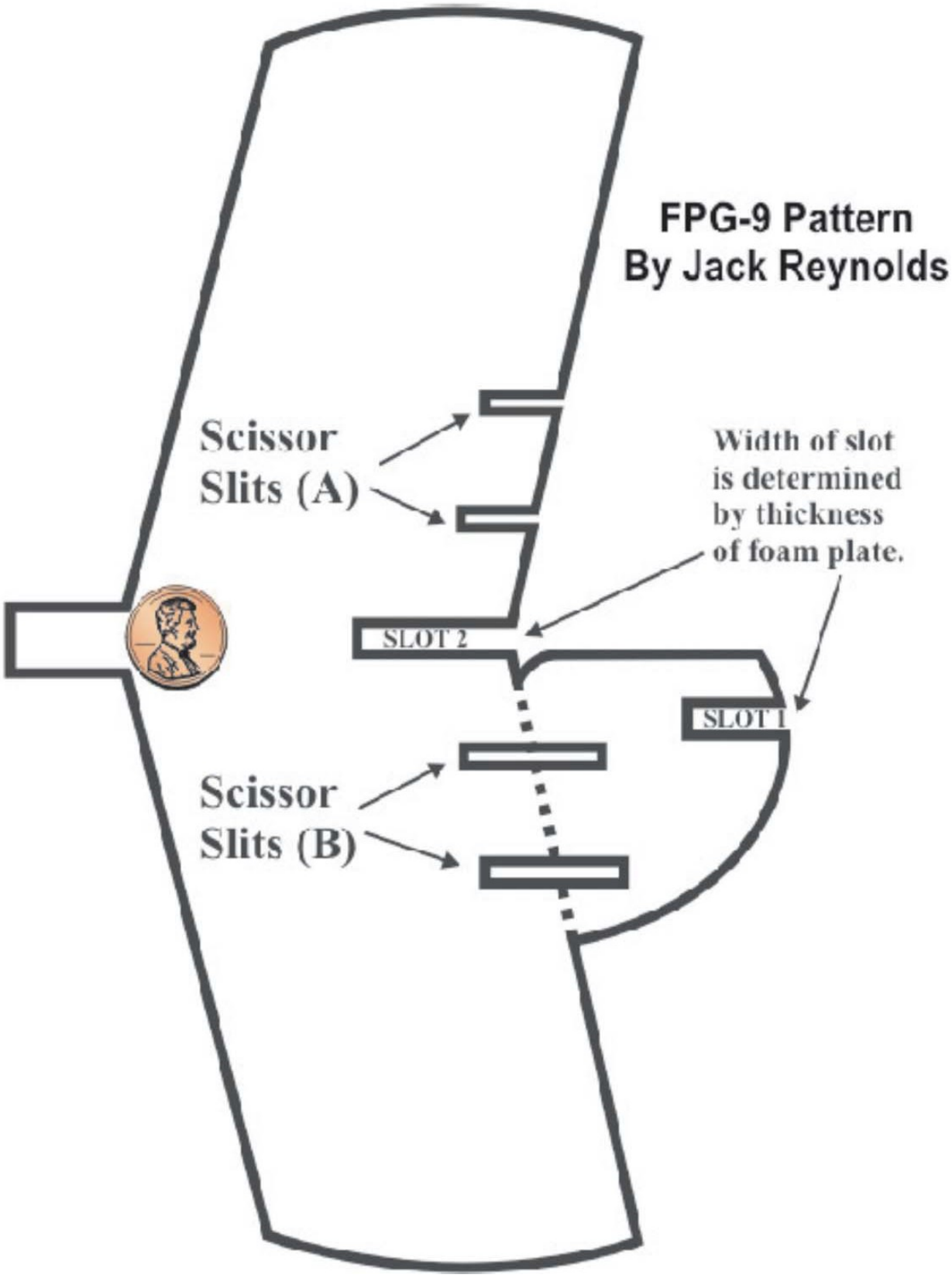
Most students can better understand how things work when they are given a toy and the time to learn about its characteristics. This simple plane will help your students understand how control surfaces affect flight. For example, they can discover for themselves that a plane will loop and turn, depending upon the position of the elevons* and rudder. Classroom work with these planes is a natural invitation for students to experiment and make observations. This discovery activity challenges students to solve problems as they devise their own experiments.

It will take approximately five minutes for students to assemble this aircraft. Once the planes are assembled, allow the students to play and experiment with their new creation for about ten minutes. After students have developed skill in "teaching the plane how to fly," they will need approximately twenty minutes to complete the FPG-9 worksheet. Make sure that your students understand that they must launch their planes with the same amount of force and at the same angle for each step in the activity. Consider wrapping up the class with a discussion of their observations and suggestions for extended study. This activity may be used as a launching point to further study the physics of flight, or to discuss the Wright Brothers' contributions to understanding how a flying machine is controlled in the air.

Good luck and have fun! More activities and suggestions for classroom use of model aircraft can be found by contacting the Academy of Model Aeronautics Education Committee at their website, *buildandfly.com*.

As Orville once said, *"I can remember when Wilber and I could hardly wait for morning to come to get at something that interested us. That's happiness!"*

- ***The FPG-9 uses "elevons" to control both pitch and roll. In a conventional airplane, elevators control pitch and ailerons control roll.***


FPG-9 Pattern
By Jack Reynolds
Scissor
Slits (A)
Width of slot
is determined
by thickness
of foam plate.
SLOT 2
SLOT 1
Scissor
Slits (B)

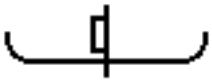
Ninety Nines Columbia Cascade Chapter
Glider Control Activity

Name_____ Troop and age _____

Directions: Answer the questions below. Draw pictures to aid each response. You should draw the plane from a rearview perspective, as though the plane is flying away from you and in to the paper. Remember to launch your plane with the same amount of force and at the same angle for each step in this activity.

1. How would you position both elevons so the plane will loop? Draw the elevons on the picture below: (You are looking at the back of the plane.)

2. What happens when the elevons are neutral (they are even with the wing) and the rudder is moved to the left? (You are looking at the back of the plane.)



3. Place the rudder in a neutral position for the following experiment: How would you arrange **both** elevons to get your plane to fly to the left? Draw the position of the plane's elevons.

4. How can you get your plane to fly to the right? There are at least 3 possible answers. Draw a picture of the back of each plane and show the position of its control surfaces. Feel free to use combinations of the rudder and the elevons.

Collect data for these two different elevon configurations:

Elevon Configuration	Flight Time (Seconds)				Average Flight Time (Seconds)
	Trial 1	Trial 2	Trial 3	Trial 4	
A) 					
B) 					

5. Which configuration (A or B) is better at keeping the nose of the plane in the air? Which plane flew longer? Why did it fly longer?

6. Which configuration (A or B) has more drag? Why? What do you think drag is?

7. Refer to the following picture to answer this question: Which wing has higher pressure under it when the plane is flying? Circle your answer below:

*The **left wing** has higher pressure under it.*

*The **right wing** has higher pressure under it.*