

Glider

Category: Physics; Force and Motion

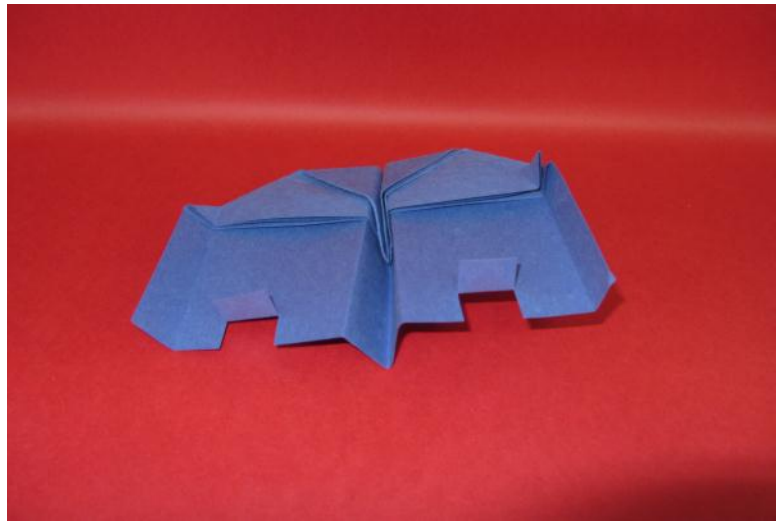
Type: Make & Take

Rough Parts List:

1	Construction paper
1	Paperclip

Tools List:

Scissors

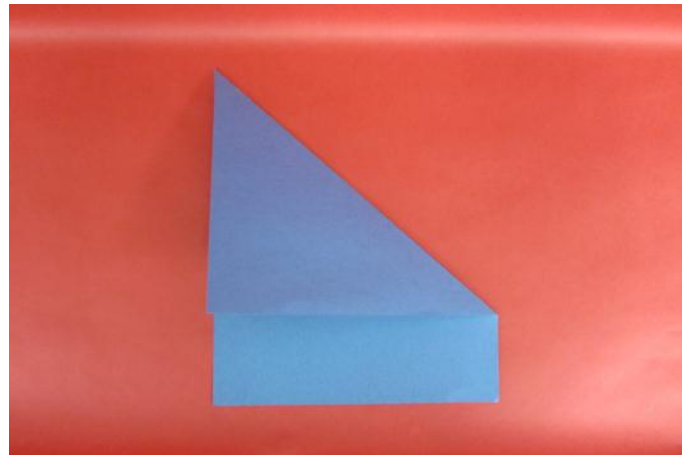


Video: <http://www.youtube.com/user/FresnoCSW/videos>

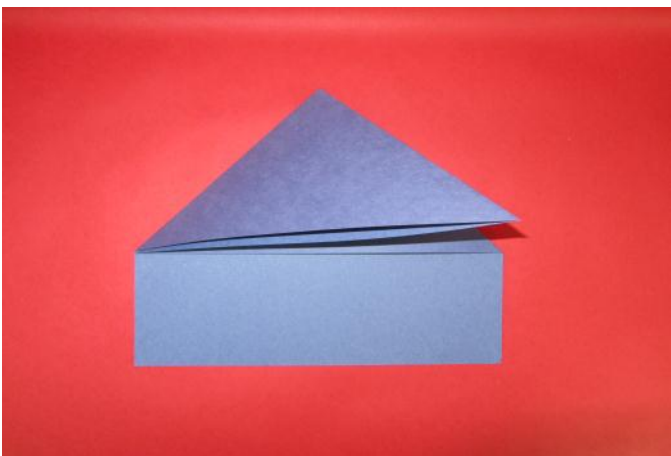
How To:



Place a sheet of construction paper vertically.



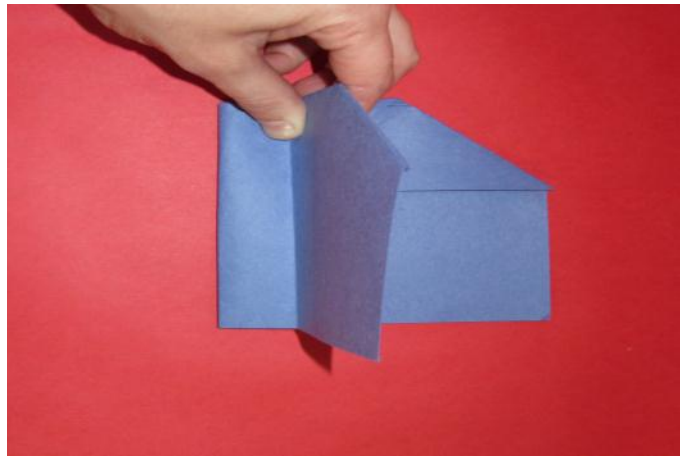
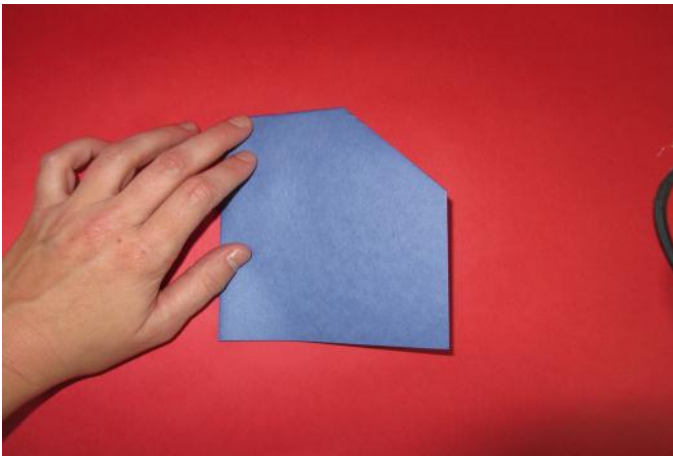
Fold down the top right corner to meet the left side of the paper.



Fold down the top corner to the right corner of the "triangle".

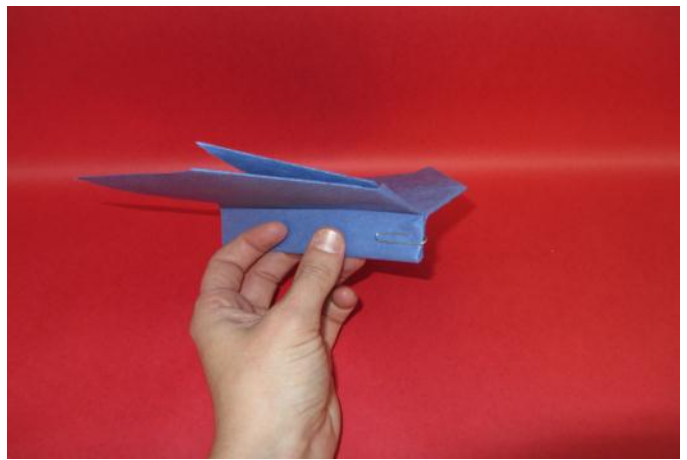
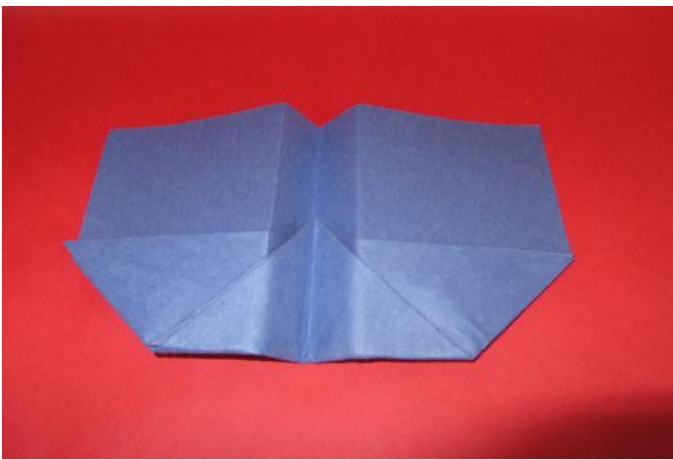


Fold down the top point slightly past the line.



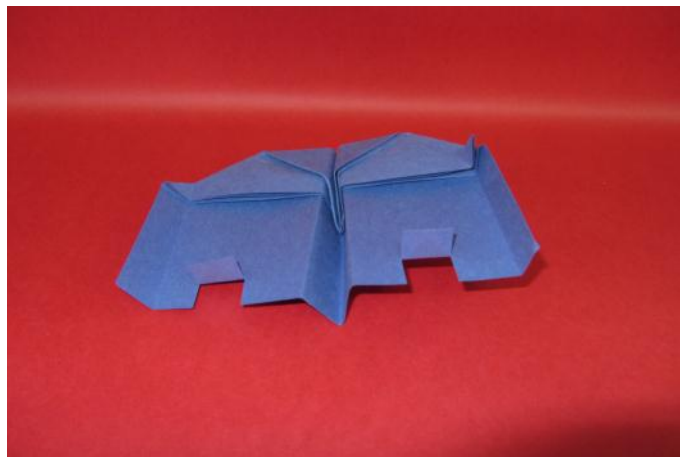
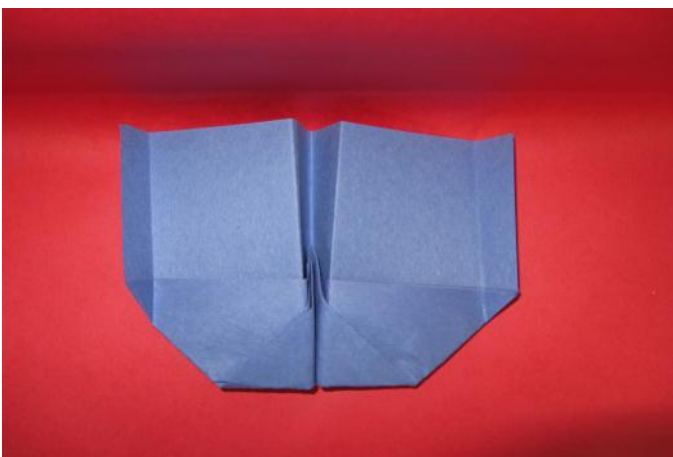
Fold the paper in half, from left to right.

Create wings by folding back each side about $\frac{1}{2}$ inches.



Glider will look like this after folding each wing.

Paperclip the body together near the nose of the glider.



Fold up the tips of the wings as desired.

Cut 2 flaps on the center of each wing. Throw the glider in the air and watch it fly!

Fine Points:

- Firmly crease each fold to create smooth lines.
- If the glider does not fly, check the folds and be sure they align with the instructions.

Concepts Involved:

- An elevator is the movable horizontal wing-like structure on the tail of the glider. It is used to control the glider's angle of flight.
- The wings on a glider have to produce enough lift to balance the weight of the glider.
- The wings and body produce drag-- resistance to the forward movement of the glider.

Focus Questions:

1. What force is pulling the glider towards the ground?
2. What happens when the elevators are moved to new positions?
3. If more weight is added to the glider, does it fly differently?

Elaboration:

The wings of a glider create the upward force of lift and assist the glider in remaining airborne. When a glider moves fast enough, the wings create enough lift to keep it in the air. The faster the glider goes, the more lift will be created.

The wings and body of a glider produce drag; the faster the glider is flying the more drag force will be applied. Because gliders do not have engines they must create movement in another way. When a glider travels at a downward angle, it gains enough speed to create lift and keep the glider in flight.

The two flaps near the back of a glider are called elevators. Elevators control the pitch – up and down movement – of the glider. Shifting the elevators up and down will have very different effects on the glider. When the elevators are adjusted, both drag and lift are affected.

Links to k-12 CA Content Standards:

Grades k-8 Standard Set Investigation and Experimentation:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other strands, students should develop their own questions and perform investigations.

Grades k-12 Mathematical Reasoning:

1.0 Students make decisions about how to approach problems:

- 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
- 1.2 Determine when and how to break a problem into simpler parts.

2.0 Students use strategies, skills, and concepts in finding solutions:

- 1.1 Use estimation to verify the reasonableness of calculated results.
- 1.2 2.2 Apply strategies and results from simpler problems to more complex problems.
- 1.3 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
- 2.5 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

3.0 Students move beyond a particular problem by generalizing to other situations:

- 3.1 Evaluate the reasonableness of the solution in the context of the original situation.
- 3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
- 3.3 Develop generalizations of the results obtained and apply them in other circumstances.