

KS3/4 DESIGN AND TECHNOLOGY

Zero Emissions Glider Launch Machine – Student Notes

Do you know about gliding?

Do you know what a glider can do? It's an awesome way to fly, and glider pilots fly hundreds of kilometres at speeds of over 100kph, just using renewable energy from the sun and the wind. To get into the air, they have to be launched using a winch, a bungee or be towed by a light aircraft.

Your challenge: Build a launch machine to launch a standard* design of glider into stable flight, to a peak height of at least 30cm and flying a distance of at least 4m

Materials available:

- A4 card; Elastic bands; Paperclips; Board at least 40cm length; String; Blocks
- Tape measure and metre rule

The Challenge:

1. Make your glider out of card to one of the two designs overleaf. If time permits, make both and see which performs better, or compare performance with a group using the other design.
2. Design and construct your launch machine.
3. Launch a glider from the ramp at ground level into stable flight to a height of at least 30cm and flying a distance of at least 4m.
4. **The glider must fly smoothly, not pitch up and stall.** Adjust the glider and launch machine until you achieve repeatable, stable flight. You might need to adjust:
 - the elevation angle of the launch ramp
 - the amount of energy transferred to the glider during the launch
 - the ballast on the nose of the glider
 - the angle of the glider wings
5. Carefully observe the effect that these adjustments have on how the glider flies.
6. Answer the challenge questions.

Challenge Questions

1. How far did your glider fly?

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2. How did you measure to ensure it exceeded 30cm above launch level at the peak of its flight?

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3. What gives the glider energy to start its flight?

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4. What was the effect of adjusting the amount of energy in launching the glider?

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Gliding STEM Resources

5. What was the effect of adjusting the angle of the launch ramp?

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6. What was the effect of altering the ballast on the nose of the glider?

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7. What was the effect of adjusting the angle of the wings? Was it easier to achieve stable flight with the wings at right angles to the fuselage, angled down or angled up?

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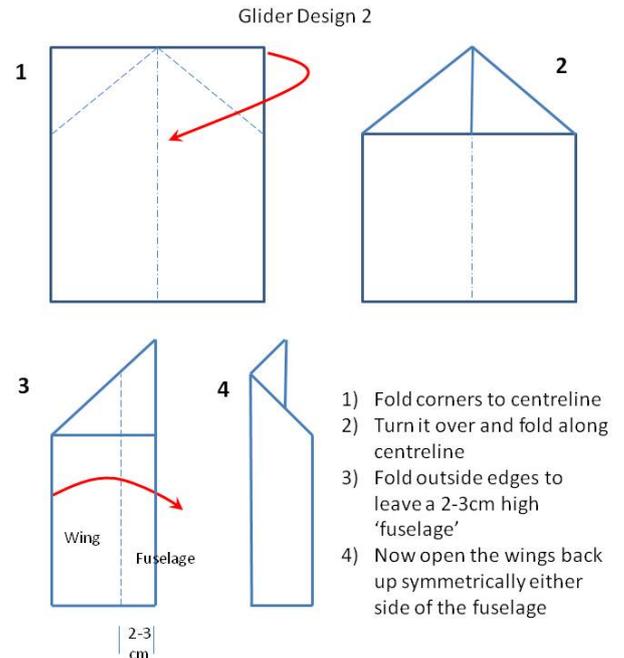
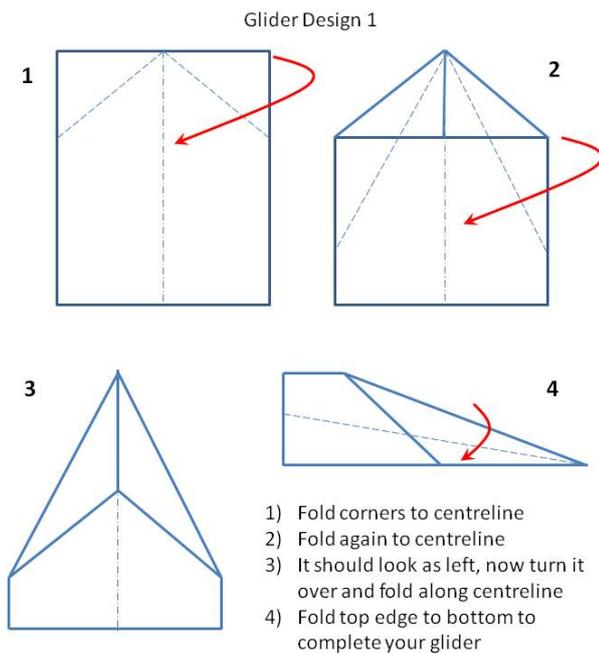
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8. How would you improve your design if other materials were available?

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*** Use one of these glider designs:**



We hope you had fun designing your Launch machine!

Find out more about GLIDING at the links below, all types of AVIATION at airleague.co.uk & CAREERS at stem.caa.co.uk/careers-in-aviation-and-aerospace

Why not Go Gliding?

Find your nearest gliding club at <https://www.gliding.co.uk/club-finder/>

We hope to see you on an airfield soon!