The Smallpeice Trust

ENGINEERING @HOME

15

The Glider Challenge

#EngineeringAtHome

Suitable for ages:	Time needed:
8+	1hr+

smallpeice
Dare to imagine

Curriculum links: Maths – shapes, measurement; Science – materials, flight; D&T – design, make, evaluate

Skills learnt: Design, building, testing, evaluation

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Dare to imagine

Since our Smallpeice team can't visit schools, we've decided to challenge each other to make a glider.

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Learning Objectives

Create purposeful, functional and appealing designs.

Select from a wide range of materials and use tools to perform practical tasks.

Build structures, exploring how they can be made stronger and more stable.

Evaluate your ideas and products against design criteria.

Topics Covered

HOW PLANES FLY
https://bit.ly/3il7aMR

AERODYNAMICS
https://bit.ly/2SwQ979

WHAT FACTORS WILL AFFECT YOUR FLIGHT
https://bit.ly/31FwUxy

WHAT MATERIALS TO USE

You can use cardboard, plastic, wood, or anything else that works well and you can get at home.

Try looking in your recycling box.

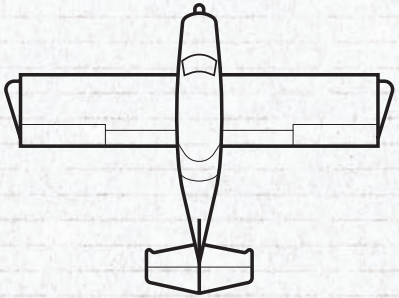
HERE'S WHAT WE USED:

1. CARD
2. BLU-TACK
3. PAPERCLIPS
4. STRAW
5. SCISSORS
6. TAPE
7. WOODEN SKEWERS

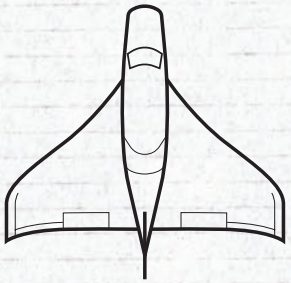
INSTRUCTIONS

1.

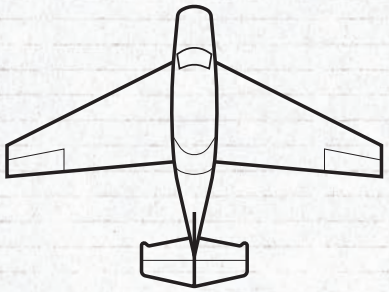
Use something sturdy as the body of your glider, we've used a straw or a wooden skewer.



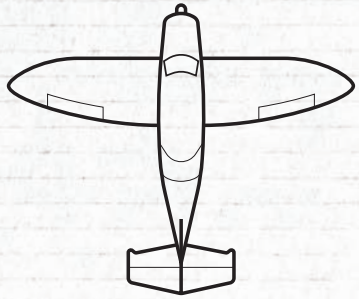
RECTANGULAR WING



DELTA WING



SWEPT WING

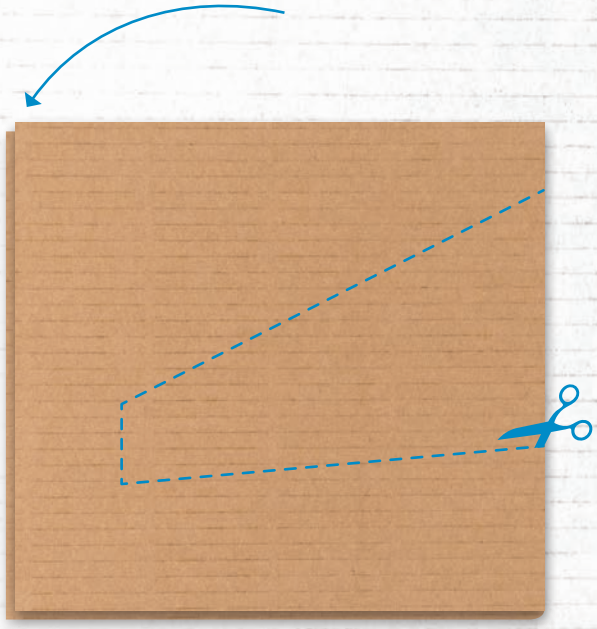


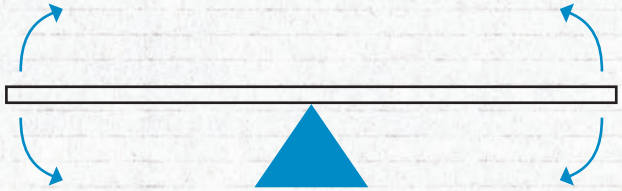
ELLIPTICAL WING

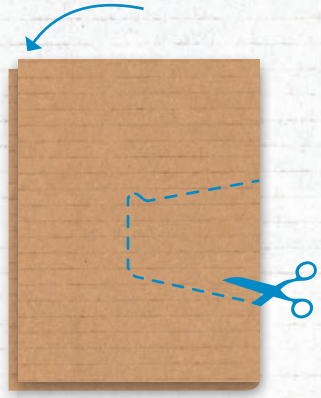
2.

Choose your wing shape – there are many to choose from, have a look at some real examples of planes for inspiration as well.

INSTRUCTIONS







3.

To make your wings symmetrical fold over a piece of card and cut out your wing shape.

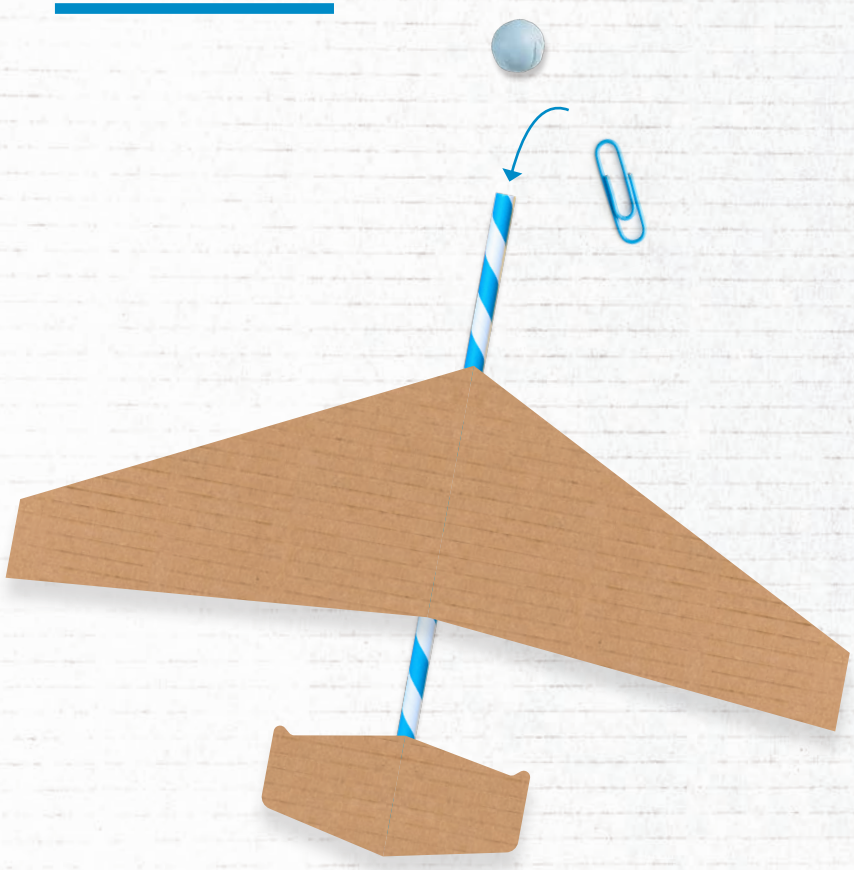
4.

Find the balance point of the body of your glider. This is where your wings should go.

5.

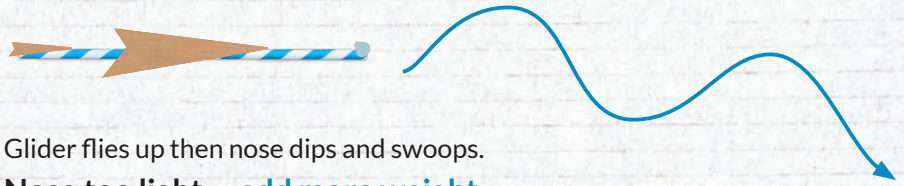
Make your tail using the same technique as the wings. Your tail acts as a stabiliser to make sure your glider doesn't roll in the air.

INSTRUCTIONS



6.

Add blu-tack or paperclips to the front of your glider to add weight.



Glider flies up then nose dips and swoops.

Nose too light - add more weight

Glider descends slowly and evenly.

Just right!

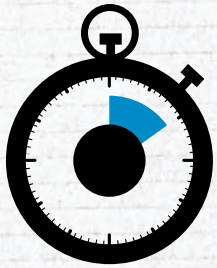
Glider dives and keeps diving.

Nose too heavy – remove some weight

7.

Have a go at testing your glider and adjust where the weight needs to be.

INSTRUCTIONS



8.

Record how far it travelled and how long it was in the air, then you can calculate the speed it was travelling at.

Use the table below:

	Distance travelled (m)	Time in the air (s)	Speed (m/s)
Test 1			
Test 2			
Test 3			
Average			

NEED A CHALLENGE?

If you complete your glider and want to challenge yourself further:

1. Decorate your glider in the most imaginative way possible
2. Make another glider with a different wing shape and see which goes further
3. Look into adding dihedrals onto your wings (watch the video to find out how we did it)
4. Look into how wing shapes can make your glider do aerobatics
5. Film a video of your glider in action and send it to us!

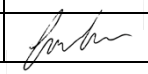
Once you've got your glider performing at its optimum, film it in action and share your video on:

www.facebook.com/TheSmallpeiceTrust

www.twitter.com/SmallpeiceTrust
Use the hashtag **#EngineeringAtHome**

www.instagram.com/TheSmallpeiceTrust

STEM Day Risk Assessment

Risk Assessment for	Engineering at Home Projects
Assessment undertaken on	31/03/2020
Assessment undertaken by	Jessica Lee
Signed	

No.	Activity/area being assessed	Associated risk	Who is at risk?	Existing control measures in place?	Level of risk (low, medium, high)	Responsibility
1	General Activity and Workspace	**Slips, trips and falls:** Injury due to tripping over items	Students and adults	Activity supervised by adult supervisor. Deliverer reminds students about safety in video introduction.	M	Students and adults
2	Use of Materials: paper/card, plastic containers	**Injuries:** Injury due to paper cuts, cuts from sharp edges **Injuries:** Injury due to misuse	Students and adults	Activity supervised by adult supervisor.	L	Students and adults
3	Use of materials: elastic bands, sellotape, glue stick, blu-tack, small toys, paper fasteners, LEGO pieces, nuts & bolts or equivalent.	**Injuries:** Injury due to use as a missile **Slips, trips and falls:** Injury due to slipping on dropped items **Injuries:** Ingestion risk of choking.	Students and adults Students and adults Students and adults	Activity supervised by adult supervisor. Activity supervised by adult supervisor. Activity supervised by adult supervisor.	L	Students and adults
4	Use of materials: plastic, corrugated carboard	**Injuries:** Cuts from sharp edges	Students and adults	Activity supervised by adult supervisor.	L	Students and adults

No.	Activity/area being assessed	Associated risk	Who is at risk?	Existing control measures in place?	Level of risk (low, medium, high)	Responsibility
5	Use of sharp tools: Scissors, craft knives	**Injuries:** Cut to self	Students	Activity supervised by adult supervisor.	M	Students and adults
		Behaviour: Cut to others	Students and adults	Activity supervised by adult supervisor.	L	Students and adults
		Behaviour: Vandalism of property	School or home	Activity supervised by adult supervisor.	L	Students and adults
6	Testing of projects: bathtub, drop from height, items on floor	**Spillage of water on floor**: damage and injury due to slip	Students and adults	Activity supervised by adult supervisor.	L	Students and adults
		Slip, trip or fall: Injury due to falling from testing area, tripping over items in testing space	Students and adults	Activity supervised by adult supervisor.	L	Students and adults