The Smallpeice Trust

ENGINEERING @HOME

03

The Parachute Challenge

#EngineeringAtHome

Suitable for ages: 5+

Time needed: 1hr+

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Dare to imagine

Curriculum links: Maths – shapes, measurement; Science – forces, air resistance, materials; 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 parachute which you can test at home.

03

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

AIR RESISTANCE
https://bbc.in/3bTPOIS

FORCES
https://bit.ly/2Jyyp6n

CALCULATING VELOCITY (AGES 12+)
tinyurl.com/upvzo2s

WHAT MATERIALS TO USE

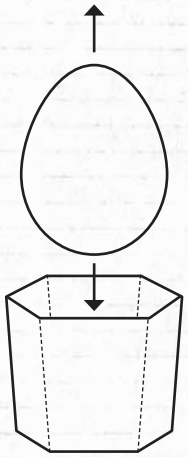
You can use cardboard, plastic, wood, or anything else that works well and you can get at home.

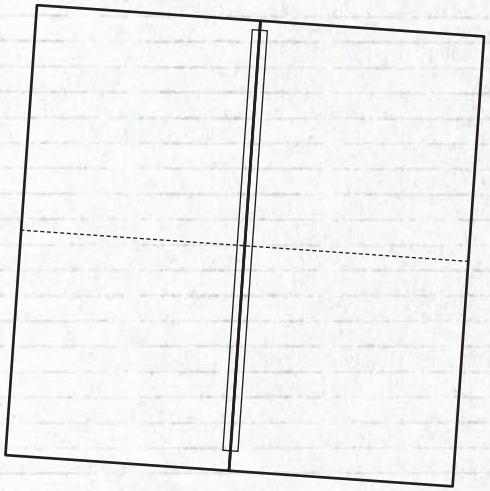
Try looking in your recycling box.

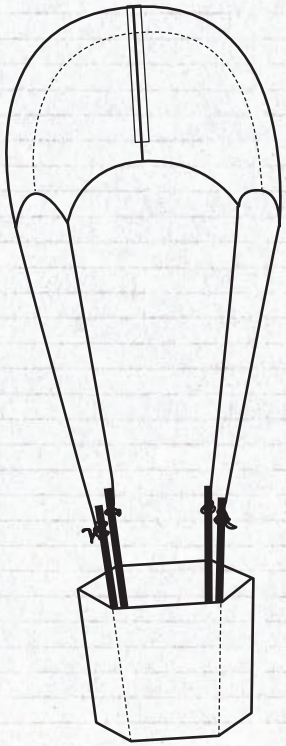
HERE'S WHAT WE USED:

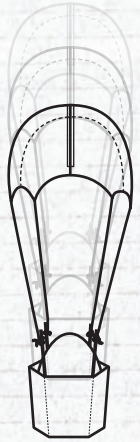
1. CARDBOARD
2. STRING/RIBBON
3. SELLOTAPE
4. SCISSORS
5. BAMBOO SKEWERS
6. EGG CARTON
7. SANDWICH BAGS
8. BUBBLE-WRAP
9. 1 HARD-BOILED EGG

INSTRUCTIONS









1.

Create a basket for your precious cargo. Make sure it can fit comfortably and can enter and exit freely.

2.

Create a parachute using a light material with a large surface area (we used sandwich bags).

3.

Attach the basket to the parachute using string, ribbon or any material you can find.

4.

Test the parachute without the cargo from a very low height.

You'll need to check that the parachute opens correctly and slowly falls to earth.

5.

When you are confident it will work, test the parachute with your cargo from a series of different heights.

NEED A CHALLENGE?

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

1. **Try and find different materials.**
   Can you improve the performance?
   Can you make it lighter?

2. **Calculate the speed that your parachute falls.**

   SPEED = Distance ÷ Time
   For our example, the parachute travelled 4.5m in 1.1s

   4.5 ÷ 1.1 = 4.2 metres per second

   Extension: can you convert the speed into miles per hour (mph) or kilometres per hour (kph)?

   You may need to look up the conversions online.

3. **Draw a force diagram showing the forces acting on the parachute.**

4. **Film a video and send it to us!**

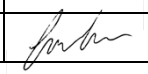
Once you've got your parachute performing at its optimum, film it in action and share your video on:

www.facebook.com/TheSmallpeiceTrust

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

www.instagram.com/SmallpeiceTrust

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