Robogals Science Challenge

Minor Challenge Set #2
STEM Field: Physics
Level: Junior
Challenge Name: Flying Rockets
Project Cost: 0-20 USD
Materials Required:

- Paper
- Empty plastic bottle
- Scissors
- Sticky tape
- Things to decorate your rocket e.g. stickers, glitter, coloured pens and pencils
- Access to printer to print template OR ruler, compass and pencil

Safety:

- Adult supervision advised for cutting with scissors and launching of rocket

Duration:

- The challenge take approximately 1 hour to finish, however, the time guideline is an estimation only, and students and mentors can complete the tasks around their schedules

Introduction:

When you squeeze a shampoo bottle to wash your hair, the shampoo comes out because you are increasing the **air pressure** inside the bottle. We can use **air pressure** to launch our rocket across the room!

We will use an empty plastic bottle to launch a rocket. The bottle isn't actually empty: it has air inside. Air can be squashed. When you squeeze the bottle, the air inside pushes back and the **air pressure** increases.

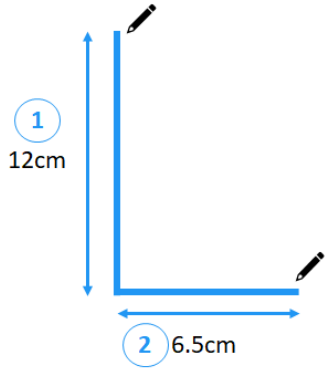
In this experiment we will launch our rockets by suddenly squeezing our empty bottles. This sudden squeezing of the bottle increases the **air pressure** inside which pushes against our rockets sending them flying upwards!

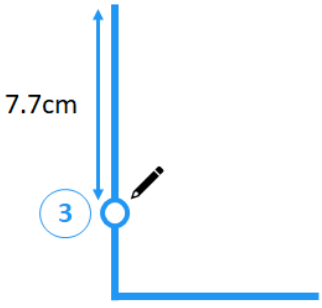
Instructions:

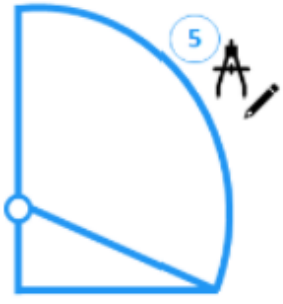
Making your Rocket

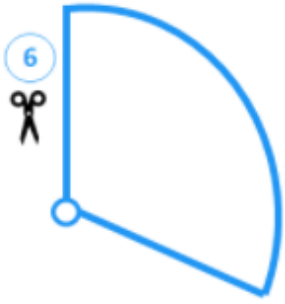
Print and cut out the template provided on page 4, or follow instructions 1 - 8 to draw your own

1) On a sheet of paper, draw a 12 cm vertical line
2) Draw a 6.5cm horizontal line, making an "L" shape
3) From the top of the "L", measure 7.7 cm down and make a dot
4) Draw a line from your dot to the end of the "L"
5) Take your compass and pencil and open it 7.7cm wide
6) Put the point of you compass on the dot and the pencil at the top of the "L"
7) Draw a curved line
8) Cut along all the lines you have drawn









Now it's time to fold your paper into a rocket:

9) Hold you paper up with the curve facing the table
10) Roll the paper round to make a cone shape
    a) If you are using the template, fold the paper so the blue part is no longer visible
11) Use some sticky tape to keep it secure

You've made your rocket, time to decorate!

12) You can decorate your rocket however you like. For example you can make it look like a mouse 

Launching your Rocket

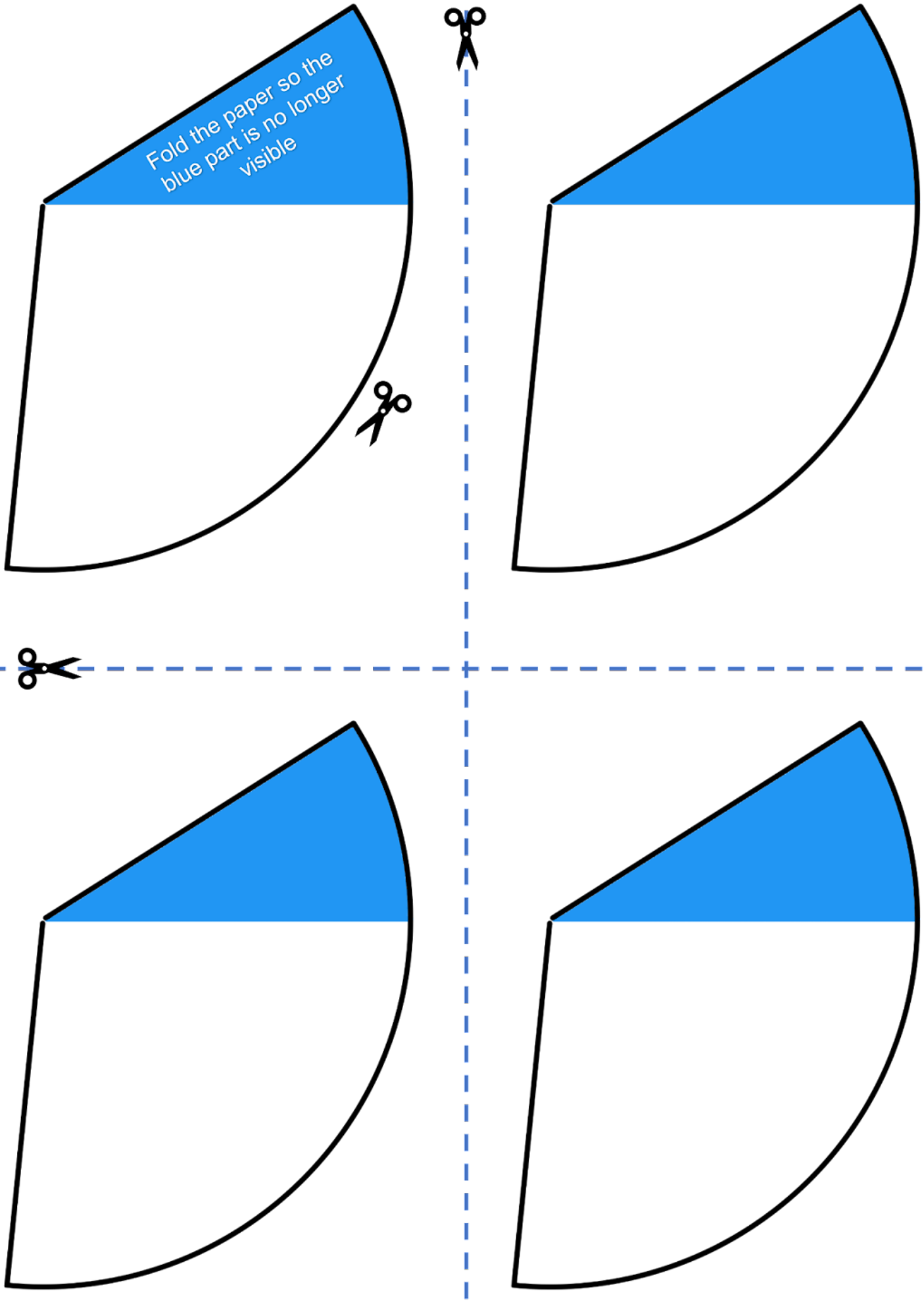
Now it's time to launch you rocket

1. Place the rocket on top of your empty bottle like its a hat
2. Put your hands to the left and right side of the bottle
3. As fast as you can, hit both sides of the bottle to launch your rocket into the air!

Reflection Questions:

- Are there any improvements you would make to this challenge?
- What real world application/s can you apply this challenge to?
- What are the key science and engineering concepts that relate to this challenge?

- What makes your rocket fly?
- What makes it fall to the ground?
- How can you make your rocket fly higher?
- Try making rockets of different sizes. Do they fly and fall differently?


Fold the paper so the blue part is no longer visible

Submission Guidelines:

- Submit photos of the experiment setup. Include a short summary that addresses the reflection questions.

> Note: Remember, if you want to upload pictures of your Minor Challenge that also include you, please check if it is OK with your parent or guardian first.

- The submission form is on the Minor Challenges page: https://sciencechallenge.org.au/index.php/minor-challenges/ Fill out the details and make sure you upload your submission.

Learn More! Resources:

- Our rockets may fly high but real rockets get to go into space! Hear from astronaut Dr Mae Jemison, the first woman of colour in space, about why she wanted to go up in a rocket: https://www.youtube.com/watch?v=JZoDnBoTTxQ

Bibliography:

- Science Museum Group. 2022. Rocket mice activity [online] Available at: https://learning.sciencemuseumgroup.org.uk/resources/rocket-mice/ [Accessed 25 February 2022].