

Suitable for
4-7 years

- ✓ Solo
- ✓ Pairs
- ✓ Groups

Adah's activity

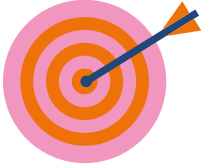
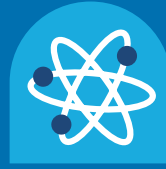
Build a rocket

How to guide



Adah's activity

Build a rocket



Aim

The aim of this activity is to make and launch rockets of different sizes and shapes to see which ones fly the highest/furthest.



Time required

10:00 – 20:00 minutes.



Materials

- Papers
- Straws
- Scissors
- Tape



Safety

The supervising adult should determine if this activity is suitable for the children, they are supervising.

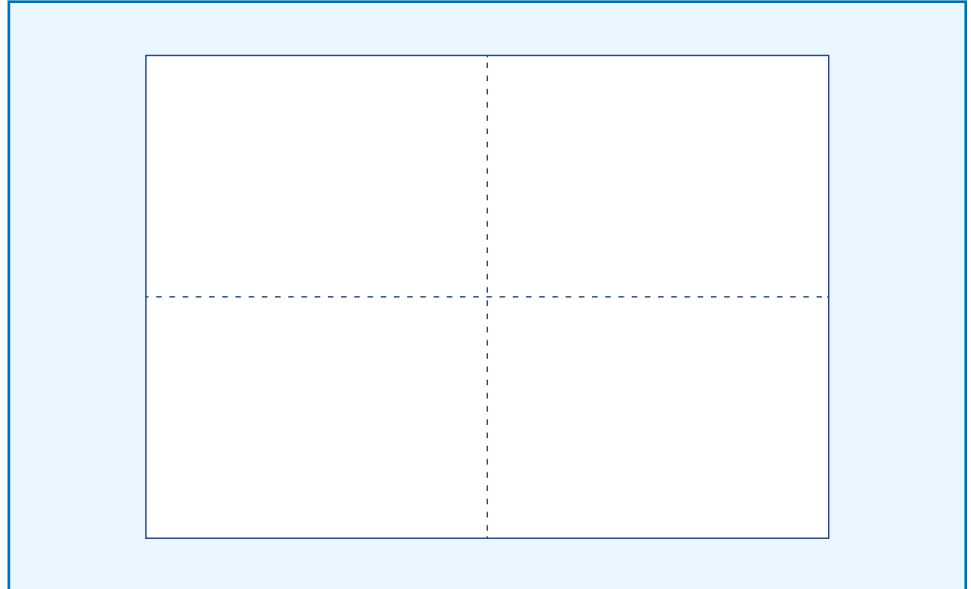
The main points of safety are however;

1. Taking care when using the pair of scissors.
2. Taking care while using the paper (avoid paper cuts).
3. When complete, be careful not to blow the rocket into the direction that there are people as the rocket can go and injure someone.

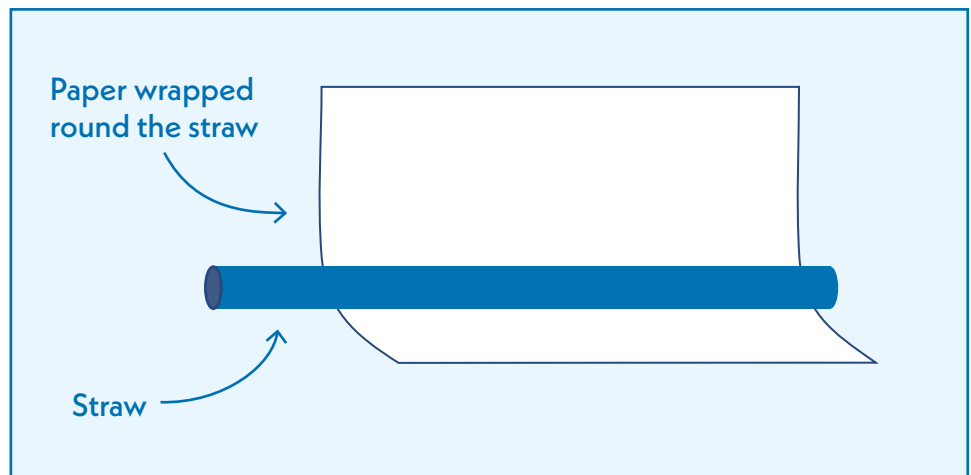


Instructions

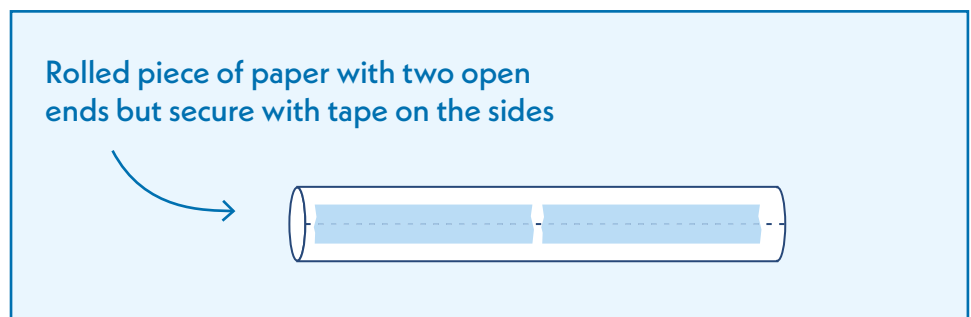
1. Take a reasonably large piece of paper say A4 or A5.
2. Cut the paper into quarters as shown below.



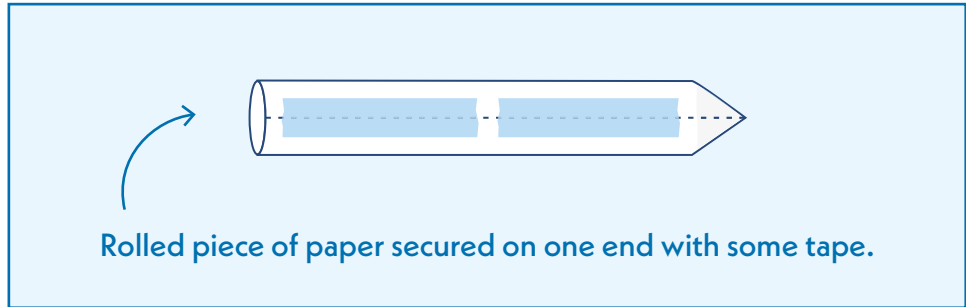
3. Using one of the cut quarters, wrap it round the straw but not too tight.



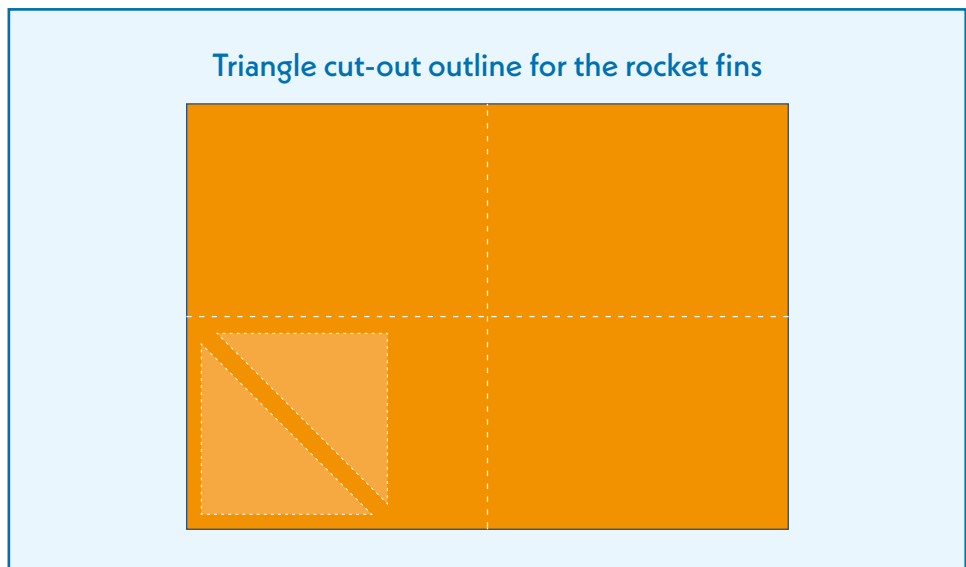
4. Remove the rolled piece and secure the rolled paper with a piece of tape.



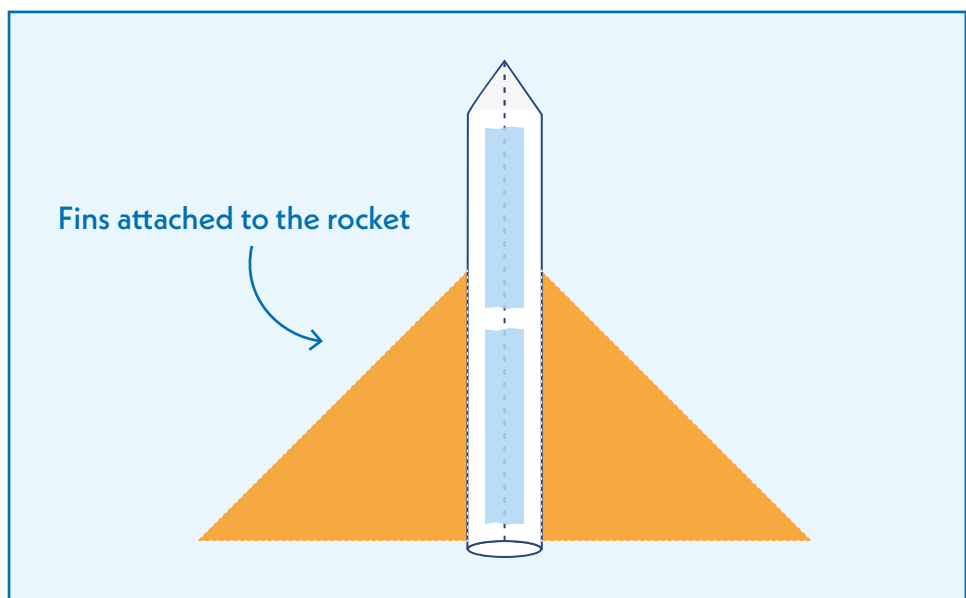
5. Pinch one of the ends of the paper to make the rocket nose and secure with tape



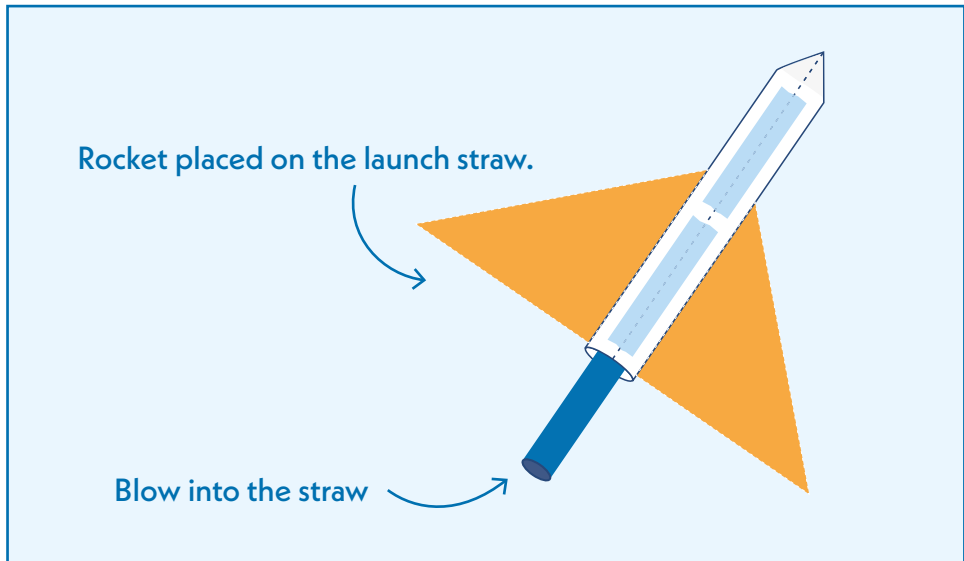
6. Using another paper (preferably different colour but can be same if no different colour is available), cut out some triangles of the same size to make the rocket fins.



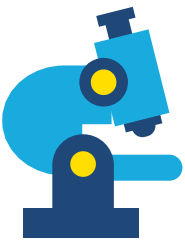
7. Attach the fins to the rocket using tape.



- Place the rocket on the straw ready to launch.
- Blow into the straw to launch the rocket.



- Now repeat the same but make different rocket lengths and even sizes.
- You may also consider changing the number of fins.
- Explain why the different rockets launch differently.



Background information

Learn about rockets

- What is a rocket?
- What are the parts of a rocket?
- How does a rocket work?
- Where do rockets come from?

Ask the questions above:

The diagram below can be used to show the parts of a rocket:
And answer most of these questions.

A rocket is simply a vehicle that uses advanced engines called rocket engines to propel it because it goes beyond the Earth's atmosphere.



The main parts are the engines/propulsion system (in our case the straw), the fins, the fuselage and the nose.

It works by cutting through air when propelled and it goes high up depending on shape, size, weight and amount of propulsion.

Rockets are designed and built by aerospace engineers who work hand in hand with many other engineers and people.

Things to discuss:

- How blocking one end and then blowing into it shows the force from your breath forcing the rocket out of the straw.
- How length of the rocket affected how far it went.
- How the increase in fins affected the rocket flight.
- The shape of the rocket, would it have performed any different if the shape is different?

By increasing the length of the rocket, the surface area increases. The rocket will have a harder time going up and you will need more air to propel it the same distance as before, reducing the distance. If shortened, it will have less surface area. It will have an easier time going up.

The fins help the rocket keep pointing in the direction it launched. When a rocket is flying through the air, changes in the air can make the rocket wobble. ... The size, shape, and number of fins will change things like your rocket's centre of mass, and how much drag it faces when it flies. ^{[2]ii}

Shaped rockets create less drag and therefore fly faster and higher. Symmetrical fins on the bottom of the rocket act as stabilizers to keep it flying straight. ^[3]ⁱⁱⁱ

Other reading sources that may be helpful:

- www.howthingsfly.si.edu/ask-an-explainer/how-do-size-shape-and-number-fins-affect-performance-rocket
- www.nasa.gov/audience/foreducators/diypodcast/rocket-science-index-diy.html
- www.ourpastimes.com/sudoku.html
- www.ffden-2.phys.uaf.edu/102spring2004_Web_projects/Andrew_Allen/Rocket_Bodies.html
- www.aauw.org/app/uploads/2020/03/aerospace-lesson-6.pdf
- www.cpb-us-w2.wpmucdn.com/blogs.egusd.net/dist/d/1479/files/2015/09/Questions-for-rocket-design-1xqzgwgy.pdf

References

- i <https://www.sciencefocus.com/space/what-is-rocket-science/>
- ii <https://howthingsfly.si.edu/ask-an-explainer/how-do-size-shape-and-number-fins-affect-performance-rocket#:~:text=The%20fins%20help%20the%20rocket,can%20make%20the%20rocket%20wobble.&text=The%20size%2C%20shape%2C%20and%20number,it%20faces%20when%20it%20flies.>
- iii <https://cpb-us-w2.wpmucdn.com/blogs.egusd.net/dist/d/1479/files/2015/09/Questions-for-rocket-design-1xqzgwgy.pdf>