

# YOU COULD BE AN... AEROSPACE ENGINEER

**This sessions story**  
Meet the Planets by Caryl Hart,  
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Caryl Hart reads  
Meet the Planets - YouTube



**What did you think of the story?**

Aerospace engineers design and build aircrafts, satellites, missiles and spacecrafts. Without them astronauts wouldn't get off the ground! People have never set foot on any other planets in our solar system. We have visited the moon, but it is much harder to make spacecrafts which support people long enough to visit the planets!



**PASSION**

**CREATIVITY**

**DETERMINATION**

**KEY SKILLS**

## STRAW ROCKET


We are going to design our own rockets. Rockets take off by burning fuel, which produces gas that escapes the rocket with force. The force of the gas escaping provides enough thrust to power the rocket upwards and escape the force of gravity pulling it back to Earth. Can we design a rocket strong enough to escape the force of gravity?

### ENGINEER KIT

- Paper Straws
- Tape
- Plastic pipettes (or straws with a larger diameter than the other set of straws)
- Markers, crayons, or coloured pencils
- Scissors
- Rocket Template (Google 'Rocket Template' or draw your own!)

### STEPS

**Make the rocket:** Decorate your rocket template or draw your own. Ask a grown up to help you cut it out.

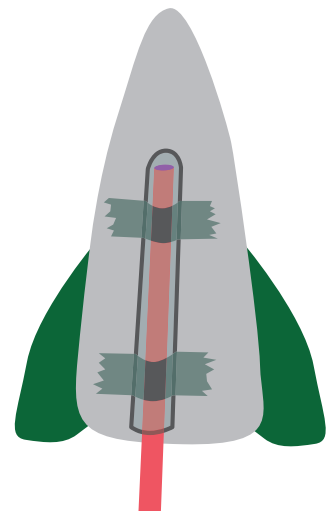
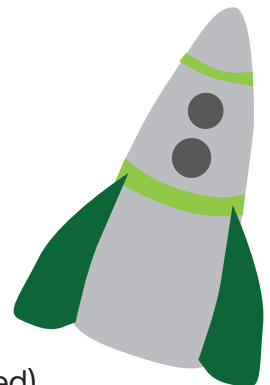
**Make the thruster:** Ask an adult to cut the bottom off the plastic pipette  and tape it to the back of a rocket. (If using a straw make sure it is wider than the other straw you'll be using for launching. Cut the straw to fit the length of the

rocket and tape one end shut so it's completely sealed)

**Ready for launch:** Slip a paper straw into your pipette, and you're ready!

**Blast off!** Give your straw a big puff of air, and watch it take off! By doing this you are providing upward thrust to your rocket allowing it to take off.

**Test it:** Experiment with how the angle you launch your rocket affects the distance it travels, try out different angles and compare them, which gets the rocket to go the furthest?



# BOTTLE ROCKET

You just practiced making a rocket using your breath as the thrust but let's make it even more powerful! We are going to use a chemical reaction which produces gas just like they do in a real rocket. (See insert for safety instructions)

If you did the session in the library this is the at-home activity

## ENGINEER KIT

- At least 500ml empty plastic bottle - with lid
- White vinegar
- Bicarbonate of soda
- Large paper straws
- A cork that fits tightly into the bottle
- Sticky tape
- A piece of kitchen roll
- A spoon

## STEPS


**Make the rocket stand:** Decorate your bottle rocket, then turn your bottle upside down and tape four straws onto it. The top should now stand about 2cm above the ground. Make sure that it is stable and doesn't fall over.

**Prepare your rocket fuel:** Cut one piece of kitchen roll in half and place one dessert spoon of bicarbonate of soda in the middle. Carefully roll the kitchen roll and twist each end so the bicarbonate of soda is wrapped like a sweet. If the paper starts to unroll dampen your finger ends and twist the paper again but be careful, don't make it too wet.

**Prep the bottle:** Pour vinegar into the bottle until it is 1/4 full. Screw the top on.

**Go outside:** Take all items outside and find somewhere flat and test that your rocket stands up.

**Get back:** Your rocket will shoot up quickly so you will need to stand well back in a safety area; five adult paces (5 metres) should be sufficient.

**Prepare the launcher:** Pick one adult to be the launcher . Turn the bottle so the screw top is upwards, take off the top and put to one side. **You will need to do the next bit quickly.** Slide the package of bicarbonate of soda you made earlier into the bottle containing the vinegar, holding the bottle as steadily as you can. Quickly push the cork firmly into the bottle. Turn the bottle over and carefully place it on the flat ground. Move back to your safety area watch the launch!

**Experiment:** What shape will make the rocket go even higher?

Why not try streamlined shapes and reduce the force of friction.

Can you improve the design of your bottle shape?

Look at a real rocket taking off - <https://www.youtube.com/watch?v=BGQC95eYTXg>



## HOW DID YOU FIND THE ACTIVITIES? DO YOU THINK YOU USED THE THREE SKILLS?

**Congratulations!** You have successfully completed your aerospace engineering training and are ready to start exploring the planets and moons just like in our story! But how do we study other planets? **Turn over to find out more...**

