Straw Rocket Activity

Difficulty: Easy for ages 8+
Safety tip: Never aim your straw rocket at anything living. It can fly fast!
Be sure each person has their own straw to use to launch the rockets.

Rockets have to work hard to get off the ground!

A rocket has to have enough **thrust** to be able to **lift** up quickly and move against gravity. The force of the thrust has to be strong enough to overcome the **weight** of the rocket. **Drag** is a force that pushes the rocket backwards as it moves through the air.

You can use simple materials you have at home to make a straw rocket and experiment with these forces. Just like a rocket engineer, you can experiment to see what designs help your straw rocket go the farthest and fastest.

Remember, if your engineering project has some problems, keep trying, and don't give up. Engineers make lots of changes to their projects, to see what works and what doesn't.

Materials

Pencil
Paper
Index card
Scissors
Tape
Soda Straw
Measuring tape

Procedure

1. Fold a piece of standard printer or notebook paper into four equal parts, folding from the top of the paper down, not lengthwise.

2. Cut the paper along the folds. You will have 4 strips of paper that are about 2 inches wide and 11 inches long. These strips of paper will be the body of your rockets.

3. Roll the paper around the pencil and gently pull it until it is snug. Slide the pencil out, and tape the paper. It should look like a long, skinny tube. If you're using a metal, reusable straw, it is thicker than a pencil, so wrap your paper around the straw instead. Your rocket body should fit without any big gaps between it and the pencil or straw, but it needs to be able to easily slide off.

4. Cut fins from your index card, and tape them to the body of your paper rocket. How many fins will you make for your rocket? You can try different numbers of fins on different rocket designs, and see how that affects how the rocket flies.

5. You can make a nose cone for your rocket by twisting the pinching the front end of the paper rocket body. You could also trace a large button or cork to make a circle of paper, then cut it out. If you cut a slit in the circle, you can fold it into a cone, like a sno-kone cup. If you make a paper nose cone, tape the cone along one side, and then gently slide it onto the front of your rocket and tape it into place.

6. Take a big sheet of paper and make a target, then tape it to a far wall. Measure the distance from the target to the spot you want to launch your rocket from.

7. Slide your paper rocket onto the soda straw. Aim your paper rocket, take a breath, and blow hard. Your rocket should launch! Make sure you only shoot your paper rocket at the target, not at living things.

8. How far did your rocket go? Record your distance, and see if you can make changes to your design, to go farther.

Think Like a Scientist

You can make lots of changes to your straw rocket, to see what happens. Try changing the size of the fins or the number of fins. Try changing the type of paper you use, or the way you make the nose cone. If a taller person launches this straw rocket, does it go farther than if a smaller person does?

Draw your different designs in your notebook. You can take a video or picture of your straw rockets and ask a parent or guardian to share it. We love to see what other engineers are making! #ScienceWorksToGo

Facilitation notes:

These are samples of questions you can ask students as starting points for their own investigations. You can choose a couple to investigate yourself, as a facilitator. Students should be learning to follow the steps of scientific discovery, rather than seeking one set answer from an authority.

How do rockets get up into the air?

Does the rocket need a nose cone? How does the nose cone help the rocket?

What happens to the rocket if there's not much thrust from the air pressure when you launch it (what happens if you blow into the straw very gently to launch it)?

What happens to the rocket if there's a lot of thrust from the air pressure at launch (what happens if you blow into the straw hard to launch it)?

Does it matter where you position the rocket body on the straw?

Does it matter where on the rocket you put the fins? How do the fins help the rocket?

What happens if you make a rocket with heavier materials? How does it fly?

If you launch your rocket outside, how did it fly differently from if you launched it inside? What was different?