Straw Rockets

Create a paper rocket and launch it from a straw!

NASA uses rockets to launch spacecraft, satellites, and astronauts into outer space. Engineers continue to design and test new rockets.

Materials Needed:

Rocket Template printable (or draw your own), pencil, scissors, tape, straw (plastic or reusable). *Optional:* measuring tape.

[Scholastic.com]

Instructions:

Step 1: Cut out the rocket body piece. Wrap the rectangle around a pencil and tape to forms a tube.

Hint: The rocket body should be loose enough that it slides off the pencil, but not so loose that there are gaps.

Step 2: Cut out the two fin pieces. Line up the rectangle in the middle with the bottom of the rocket body. Tape the fin to the body tube. Tape the other fin on the opposite side.

Step 3: Bend the fins so that they are at right angles to each other. Looking at the bottom of the rocket, the fins should look like a plus sign (see picture).

Step 4: Twist the top of the rocket body around the tip of the pencil to create a nose cone. Tape the cone shut.

Step 5: Launch your rocket! Remove the pencil and replace it with a straw. Make sure that your launch area is clear of people and other hazards. Then blow into the straw to launch your rocket.

Step 6: Measure how far your rocket traveled. Can you make your rocket fly farther? Try adjusting the design and launching it again. Try different rocket lengths, fin shapes, fin sizes, or fin angles.

Activity and images adapted from NASA JPL:
www.jpl.nasa.gov/edu/learn/project/make-a-straw-rocket/

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K-12 Students

Make a Straw Rocket

Create a paper rocket that can be launched from a soda straw – then, modify the design to make the rocket fly farther!

Materials

- Pencil
- Scissors
- Tape
- Soda straw (plastic or reusable)
- Meter stick or measuring tape
- Rocket template

1. Cut out and shape the rocket body

Cut out the rectangle. This will be the body tube of the rocket. Wrap the rectangle around a pencil length-wise and tape the rectangle so that it forms a tube.

2. Cut out and attach the fins

Cut out the two fin units. Align the bottom of the rectangle that extends between the fins with the end of the rocket body, and tape the fin to the body tube. Do the same thing for the other fin on the opposite side, making a “fin sandwich.”

3. Bend the fins

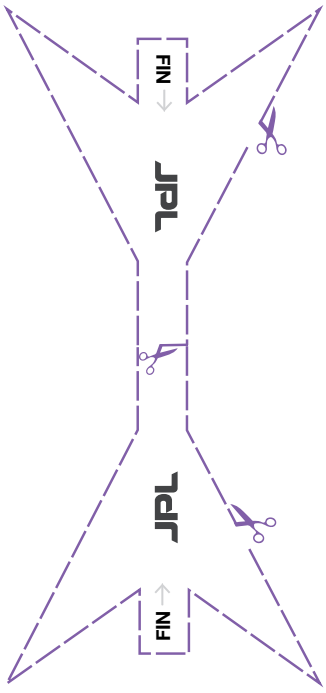
Bend the fins on each fin unit 90 degrees so that they are each at a right angle to each other. When you look along the back of the rocket, the fins should form a “+” mark.

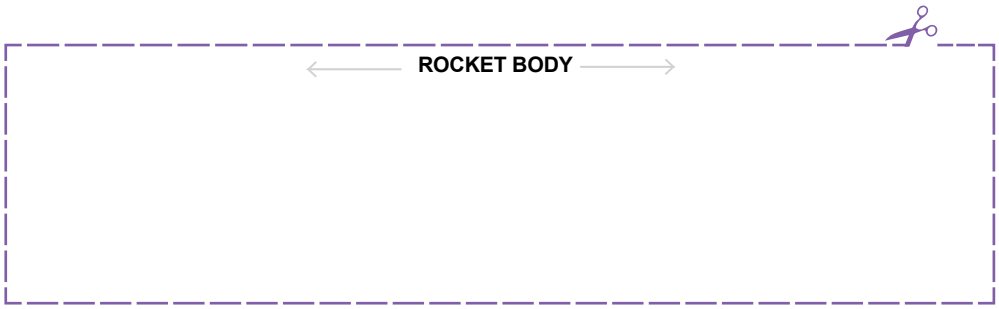
4. Make the nose cone

Twist the top of the body tube into a nose cone around the sharpened end of your pencil.

5. Prepare to launch!

Remove the pencil and replace it with a soda straw. Be sure your launch area is clear of people and hazards. Then, blow into the straw to launch your rocket! Record the distance the rocket travels on your data log.





Launching Rockets

Scientists use rockets to launch spacecraft, satellites, and astronauts into outer space.

Many rockets carry scientific instruments. Scientists on the ground can use these instruments to explore Earth, the solar system and beyond. Scientists have used rockets to study the aurora, X-rays from the Sun, meteorite impacts on Jupiter, and much more!

In Interior Alaska, the University of Alaska operates Poker Flat Research Range, the world's only scientific rocket launching facility owned by a university. Every year, scientists at Poker Flat launch scientific sounding rockets, mostly to study the aurora.

Left: Rocket Launch at Poker Flat. Image: NASA/Chris Perry.

To launch, a rocket must have enough fuel, or *propellant*, to give the rocket enough energy to boost away from Earth's surface. Most rockets use both a liquid propellant and a solid rocket fuel as an extra booster. The fuels are pumped or packed into a combustion chamber. The rocket reaction creates a high-pressure and high-velocity stream of hot gases. These gases are propelled out of the engine, pushing the rocket away from Earth.

Right: Antares Rocket Launch, 2013. Image: NASA/Bill Ingalls.

Testing a rocket. Image: NASA/Marshall Space Flight Center.

The design of a rocket influences how well it can fly. Over the last 100 years, rockets have grown larger and more powerful, but rocket designs are still improving. Engineers design and test each part of a rocket. By changing one variable at a time, they can determine if that change leads to an increase or decrease in performance. Then they adjust their design and try again.

Discover more about rockets:

spaceplace.nasa.gov/launching-into-space/en/

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