

NAME: _____

Straw Rockets and Parabolas

You and your engineering team will be competing in a straw rocket competition and want to engineer a rocket that can win!

There are two ways that you can win: A) Rocket that flies the highest
B) Rocket that flies the furthest.

Using the provided instructions, build a straw rocket.

Launch your rocket at three different angles. For each launch, take measurements such as angle of elevation, starting elevation, maximum height reached, and distance traveled. Provide illustrations for each launch situation.

Launch 1

Launch 2

Launch 3

How does the angle in which the rocket is launched impact height and distance?

Straw Rocket Competition Analysis

Rocket that flies the highest

At what angle will you shoot your rocket to potentially win the award for the rocket traveling the highest?

Model the path of the rocket with a picture AND model the path with a function where x represents horizontal distance traveled and $f(x)$ represents vertical distance traveled.

Rocket that flies the farthest

At what angle will you shoot your rocket to potentially win the award for rocket traveling the greatest distance?

Model the path of the rocket with a picture AND model the path with a function where x represents horizontal distance traveled and $f(x)$ represents vertical distance traveled.

K-12 Students

Make a Straw Rocket

Create a paper rocket that can be launched from a soda straw.

NOTE: These directions and template are from a modified version of a classroom activity from the National Aeronautics and Space Administration – Jet Propulsion Laboratory found at: https://www.jpl.nasa.gov/edu/pdfs/strawrocket_worksheet.pdf

Materials

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

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

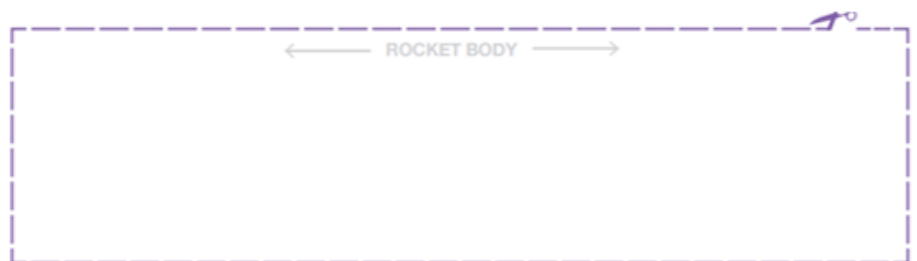
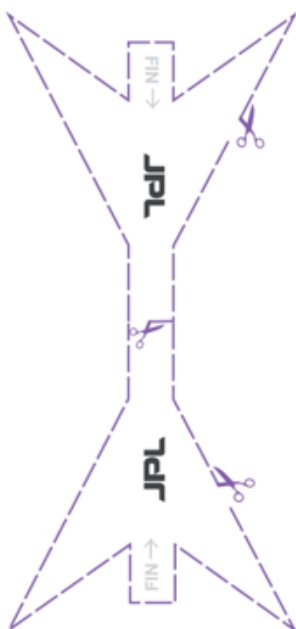
Twist the top of the body tube into a nose

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!

For building assistance check out:

<https://youtu.be/aTd2f59TSVo>



NOTE: This activity is a modified version of https://www.jpl.nasa.gov/edu/pdfs/strawrocket_worksheet.pdf