

# TAKE & MAKE KIT

## Rocket Launch

TIME: 45 min

CONTAINS SMALL PIECES

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## What's in this kit?

What do rockets, airplanes, and skyscrapers have in common? They help humans get closer to the sky! Make your own parachute and take part in the universal engineering feat of touching the sky. Launch your cargo and watch what happens when your parachute is activated.

### You will learn:

- Physics
- Engineering

## Let's Get Started!

### Materials

Tape  
2 pieces of string  
1 plastic sheet  
1 dinosaur toy  
Rock

### Tools

Scissors

## Step 1 - Organize your materials

Your kit will come with 3 pieces of string. Unravel your strings, you will find 2 equal length strings and one long string. Put the two equal strings together and keep the longer one separate.



## Step 2 - Take a walk, grab a rock

This project will need a rock from outside. Go take a walk and find a rock that's bigger than a pebble and smaller than a golf ball. You can do this step at any time.

## Step 3 - Cut your plastic sheet

Lay your plastic sheet out evenly and cut squares in the corners. These squares should be about 5 inches on each side. This should leave your plastic sheet looking more like this:



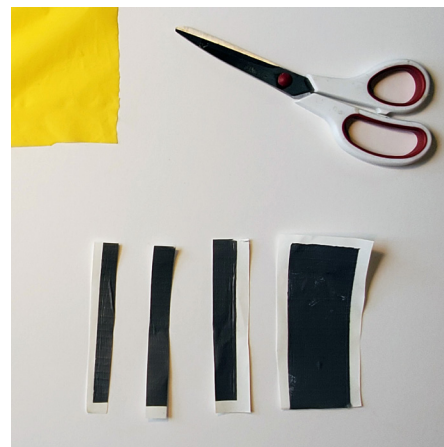
## Vocabulary

**Air resistance** - The resistance and force that air has against a moving object. A slim object doesn't have as much air resistance as a spread out object. A parachute has enough air resistance to slow down the descent of an object.

**Centrifugal force** - The apparent force that is felt by an object moving in a curved path that acts outwardly away from the center of rotation

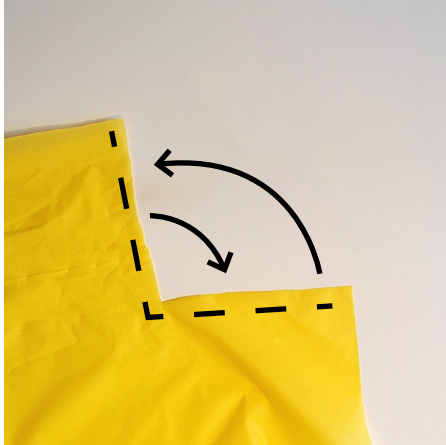
## Step 4 - Cut tape into thin strips

You can now cut your tape lengthwise into skinny strips. It will probably be easier if you cut it while it is still stuck on the wax sheets.



## Step 5 - Forming the parachute

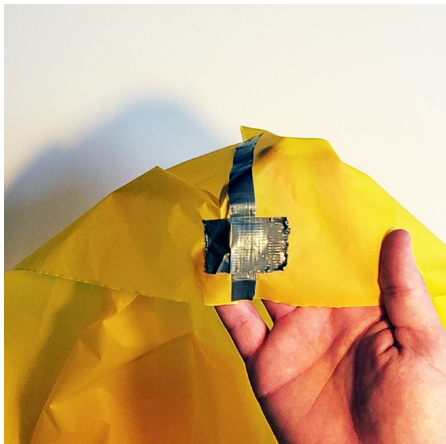
Once you have cut out 4 skinny strips of tape, you can now tape the corners of your parachute together. Start by picking one corner with a square cut out of it. Match the edges of the square and tape these sides together with the thin tape strips.



Do this for all corners of the plastic sheet. Your piece should now start to take form of a parachute.

## Step 6 - Tape the corners more

With the remaining tape, you can put a small square towards the edge of the plastic sheet, this will reinforce the plastic for when you cut into it.



Now cut a small slit near the edge of each corner to allow a string to pass through.



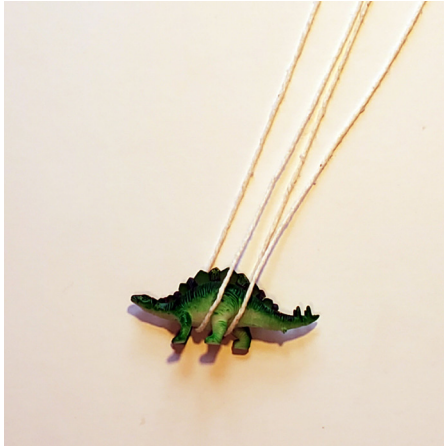
## Step 7 - Tie the strings of the parachute

Get your two smaller strings. Take one string and tie it in one of the holes. Use the other end of the string and tie it to an adjacent corner. Repeat this with your shorter string on the other 2 holes of your parachute. You should be able to inflate the parachute by holding the 2 strings and running.



## Step 8 - Attach the cargo (the dinosaur)

Attach the dinosaur at the middle point where the two parachute strings cross. Wrap your dinosaur and tie a knot if you can. You can also cut off 6 inches of your long piece of string and attach your dinosaur to that before tying it onto the parachute.



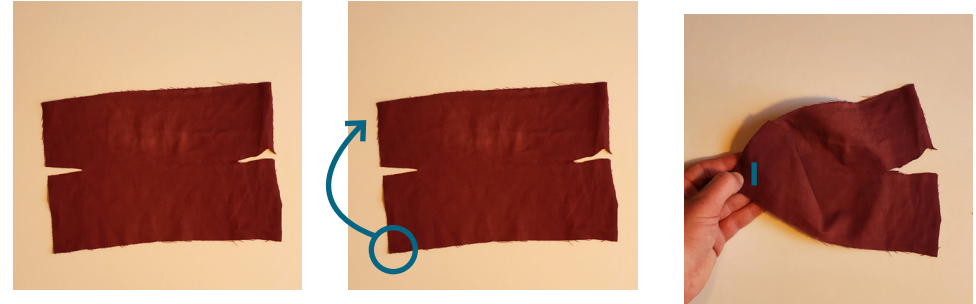
## Step 9 - Attach the rock (optional)

Cut about 12-16 inches of string from the long string. Your parachute might need more weight for it to properly deploy. Wrap the string tightly around a rock and then tie it to the dinosaur. This is an optional step. You can cut the string now and come back to this step later.

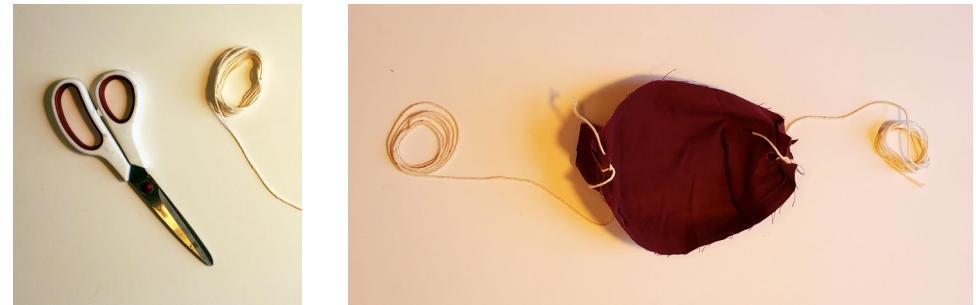


## Step 10 - Make your launching mechanism

Grab your fabric and cut two slits as shown. You will then overlap two flaps on one end and cut a slit in both tabs. The cut just needs to be big enough to slide a string through it. Repeat this on the other side.



Now take your remaining long string and cut it in half. Overlap 2 end flaps and run the string through it, now tie a knot leaving one long end of the string. Repeat this step on the other end. You should end with a loose pocket-like form and a string on both ends.



## Step 11 - Lights, camera, lift off!!

You're now ready to launch your projectile. Find an open field or park away from buildings, people and cars. Gently roll up your parachute, leaving the dinosaur on the outside. Tuck the rolled up parachute into the pocket of the launching mechanism. Hold onto the two strings and spin the launching mechanism in a circular motion. Let go of the strings as the rocket moves upward, thus activating the launching mechanism. This will take some practice! Check out the tutorial [@MilwaukeePublicLibrary on YouTube](#) if you need to see this part in action before trying it yourself.



## Challenge!

The launching mechanism you built uses hand powered propulsion and centrifugal force to launch the projectile. Can you think of other methods or devices that would achieve the same function? Can you improve this launching mechanism or build another one?

## Go Beyond

Use the techniques you have learned to create a bigger parachute with a garbage bag at home. Launch the projectile and count the seconds it takes for the parachute to land. Compare this to the smaller parachute. What differences do you notice?

HANG OUT,  
MESS  
AROUND,  
GEEK OUT.



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