Materials needed:

¾" PVC Pipe
Inner tube
1L or 2L empty plastic bottle
Tape (duct tape, scotch or masking tape)
Copy paper
Cotton ball or Pom-pom
Optional: large milk shake straw, ribbon

VIDEO INSTRUCTIONS at SciWorkshop.org/KITS

Build the rocket launcher

1.

Attach the inner tube to the PVC pipe with duct tape. Wrap tape tightly and make sure no air will leak out.

2.

Duct tape an empty plastic bottle to the other side of the PVC pipe. Again, make sure the tape is tight.

Completed launcher, ready to use!

Build a rocket (easy straw method)

1.



Push a glue stick piece into one end of the straw. This gives a little weight to the front of the rocket to balance it.

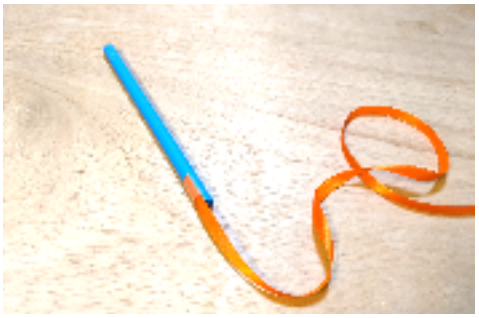
2.



Tape a small pom-pom over the glue stick to make a soft tip on the nose of the rocket.

Tape securely with extra layer of masking tape.

3.



Tape a ribbon to the tail end of the rocket.

4.

Load the rocket into the launcher tail-end first.

Go to an open area where the rocket won't hit anything.
Point the launcher away from people and step on the bottle!
Re-inflate the bottle by blowing into the launch tube

If you have questions or would like more materials, contact team@sciworkshop.org

See video at SciWorkshop.org/KITS to see how to build a paper rocket with fins and nose cone, that uses the same launcher

Tips and tricks:

Point the rocket away from people - including yourself! :)

Launch the rocket in a safe location where it can fly freely, without hitting any objects

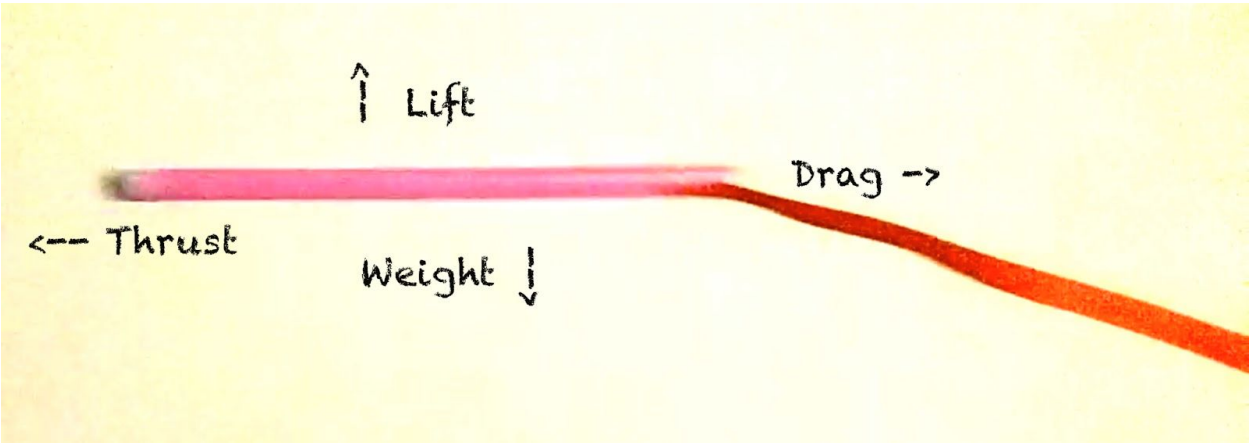
To do and to notice

Is the path of the rocket straight or curved?

At what point is the rocket moving the fastest?

If you increase the size of the bottle, what do you think will happen?

Deeper Dive



The four forces working on your little rocket (and all flying objects *not* in outer space!) are **lift, thrust, drag,** and **weight**. The forces work in pairs, opposing each other. When the forces are perfectly balanced a rocket flies in a level direction. You gave the rocket forward thrust by pushing air out of the bottle. Drag works in the opposite direction by slowing the rocket down with air friction and pressure. Weight is the force caused by gravity, which works against lift and pulls your rocket back down to the ground.

A big breakthrough in rocket science is designing re-useable rockets. In the past rockets headed to outer space have been single use and they break up when they return to earth. By designing rockets that can land safely back on earth you can make launching satellites or trips to the space station, the moon, or mars much more affordable! Search online for “reusable rocket” to learn more and follow this exciting technology as it develops.

Even when a rocket fails there is a lot that engineers can learn from the failure, to make the rocket better. Experiment with your rocket and don’t be afraid to fail! Build a paper rocket (see video instructions) and try out different numbers and shapes of fins, add a nose cone, change the body length, or use a different sized launch bottle. Have fun!