

# STRAW ROCKETS

IN THE CLASSROOM- GRADES 3-8



Group Size	4-6 (Recommend 4)
Duration	Determined by activity selected (Most are between 45-180 minutes)
Materials/ Equipment	Materials and worksheets will vary depending on the activity the teacher selects.
Resources	<p>Straw rocket launcher video:  <a href="https://video.pitsco.com/default.aspx?VID=670&amp;p=1">https://video.pitsco.com/default.aspx?VID=670&amp;p=1</a></p> <p>Straw rockets in Elementary success stories:  <a href="https://asset.pitsco.com/sharedimages/resources/straw%20rockets%20in%20elementary%20success%20story.pdf">https://asset.pitsco.com/sharedimages/resources/straw%20rockets%20in%20elementary%20success%20story.pdf</a></p> <p>STEM Connections:  <a href="https://asset.pitsco.com/sharedimages/resources/stem/straw%20rockets_stem_2014.pdf">https://asset.pitsco.com/sharedimages/resources/stem/straw%20rockets_stem_2014.pdf</a></p> <p>Straw Rocket Launcher User Guide:  <a href="https://asset.pitsco.com/sharedimages/resources/straw-rocket-launcher-ii-ug-20426.pdf">https://asset.pitsco.com/sharedimages/resources/straw-rocket-launcher-ii-ug-20426.pdf</a></p> <p>Straw Rocket Class Pack Teacher Instructions which includes student instructions:  <a href="https://asset.pitsco.com/sharedimages/resources/userguide/straw_rocket_cp_ug_35784.pdf">https://asset.pitsco.com/sharedimages/resources/userguide/straw_rocket_cp_ug_35784.pdf</a></p> <p>Straw Rockets Teacher's Guide</p> <p>Straw Rocket Grade 3-5 Elementary STEM Activity Guide</p>
Objective	<p>The objective will vary depending on the activity selected.</p> <p>Standards can be found in the teacher's guides.</p>
Preparation	<p>Preparation will depend on activity selected. Use teacher guides for guidance in selecting the activity for the classroom. Review the activity plan prior to class.</p> <p>Review the Straw Rocket Launcher User guide for information on usage and care of the launcher. Create a straw rocket prior to class to use as a visual aid. Prepare the launch areas prior to class. Note: straw rockets can travel up to 50 feet.</p> <p>If worksheets are needed, have one copy of each worksheet per student.</p> <p>At the end of each activity, please inventory the items in the kit. Kits are to be returned on time and in good condition.</p> <p>We anticipate that your classroom will have scissors and markers, please contact the site lead if you do not have access to scissors.</p>
Procedure	<p>Procedure will vary depending on activity selected. The procedures can be found in the teacher instructions and in the student instructions in the teacher guide books.</p> <p>Demonstrate to students how to build a straw rocket and how to use the straw rocket launchers.</p>

Potential Questions	<p>Potential questions will vary depending on activity selected. See the teacher's guides for potential questions for your specific activity. Vocabulary lists are also provided for each activity which can be accessed through <a href="http://www.pitso.com">www.pitso.com</a></p> <p>What is force? How do you think you will adjust the force with the launcher? What is mass? How would you change the mass of the rocket? What would happen if you changed the mass of the rocket? What is a variable? Why is it important to only change one variable at a time?</p>
Air Force Connection	<p>According to Career One Stop, the definition of an Aerospace Engineer is one who performs engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. An Aerospace Engineer may also conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture and recommend improvements in testing equipment and techniques.</p> <p><a href="https://www.careeronestop.org/videos/careeronestop-videos.aspx?videocode=17201100">https://www.careeronestop.org/videos/careeronestop-videos.aspx?videocode=17201100</a></p> <p>Browse the website <a href="https://www.airforce.com/careers/browse-careers/">https://www.airforce.com/careers/browse-careers/</a> to find 13 careers related to aerospace in the Air Force.</p> <p>One aerospace career found in the Air Force career finder is Aerospace Propulsion. In this career field, the responsibility is to ensure that all of the plane's engines are in first-rate operational conditions. Aerospace Propulsion specialties test, maintain, and repair all parts of the engine. This career field plays a critical part in keeping planes and Airmen safe in the air.</p> <p><a href="https://www.airforce.com/careers/detail/aerospace-propulsion">https://www.airforce.com/careers/detail/aerospace-propulsion</a></p>

# Straw Rockets: In the Classroom

## Steps to Build a Basic Straw Rocket

1. Design a rocket. Determine the fin shape, number of fins, rocket length, and nose cone shape. Students can also use one of the premade templates as fins.
2. Draw the chosen fin shape on an index card, drawing as many fins as you wish to have on your rocket. (There are usually two to four fins per rocket). If a template is used, those will be the fins.
3. Use scissors to cut out the fins.
4. Cut the straw to the desired length with the scissors; the straw serves as the rocket body
5. Cut or tear pieces of tape the length of the edge of the fin that is to be connected to the rocket body. Place the tape on the edge of the fin and repeat for all fins.
6. Attach the fins so that they are evenly spaced around the straw. Carefully trim off any excess tape.
7. Knead the clay to soften it, and carefully shape the clay to match your nose cone design.
8. Press the nose cone on top of the straw rocket body. Some of the clay should go inside the rocket body. The outside edge between the straw and the nose cone should be sealed carefully with clay because any gaps where air can escape will cause the rocket to not launch properly.
9. Your rocket is done! After making the rockets, you will direct students to the launching area and have them launch the rockets using the straw rocket launcher.

## To Launch:

1. Slip the straw rocket over the launch tube.
2. If the launch tube moves while putting the straw rocket on, carefully move it to adjust the angle and line the rocket up with desired trajectory angle (45 degrees provides a nice launch). Remind students to be very careful when moving the launch tube.
3. Raise the launch rod to the desired height. By varying the launch rod height, which is calibrated in centimeters, the students can control the distance of the rocket's flight. Ensure that the launcher base remains flat on the floor.
4. To launch, release the launch rod so that it falls to the bottom of the cylinder. This action compresses the volume of air in the cylinder and forces it out of the launch tube, blasting the rocket away from the launcher. Note: When rockets are launched, simply release or drop the launch rod. Avoid forcing/pushing the rod into the cylinder.

## Additional Activities:

Additional activities can be found in the teacher's guides or online at [www.pitsco.com](http://www.pitsco.com)