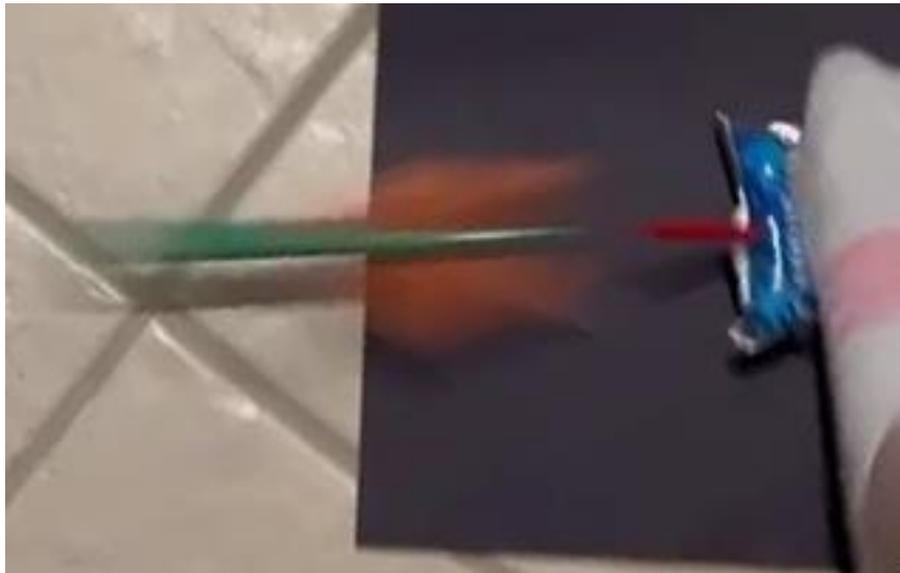


STOMP ROCKETS

Instructor's Activity Guide

Time Requirement: 15-30 minutes

Target Grades: 3-8



Objective

Students will study principles of aerospace through designing, building, and testing a rocket. Topics to discuss can include forces (thrust, drag, lift, and weight), aerodynamics, and propulsion.

Materials

Material	Quantity (Per Student)	Notes
Construction Paper	1 sheet	Can use cardstock for sturdier fins
Juice Pouch	1 pouch	Any aluminum juice pouch (not box)
Plastic Straw	½	Regular wide plastic drinking straw
Tape	Several strips	Masking tape is easiest, but any works
Scissors		

Table 1 Materials

Rockets can be launched either indoors or outdoors, but they should not be launched over carpet, as droplets of juice may occasionally spray when the rocket is launched.

Concepts

- **How Airplanes Fly:**
 - [SciShow Kids “How Airplanes Fly!”](#)
- **Juice Pouch Engine:**
 - Air through the straw allows our rocket to “blast off.”
 - [The Launch Pad “LIFTOFF! SpaceX Starship 11th Flight Test”](#) (students can count down from 10 until liftoff!)
- **Lift vs Weight:**
 - Figure 1: Think of putting your hand out the window – if you put it out horizontal to the ground, you float on the wind, but if you horizontal you’ll get blown backwards (drag).
 - Figure 2: If lift > weight, we will go up. If weight > lift, we can’t get off the ground.



Figure 1 Hand out the Window

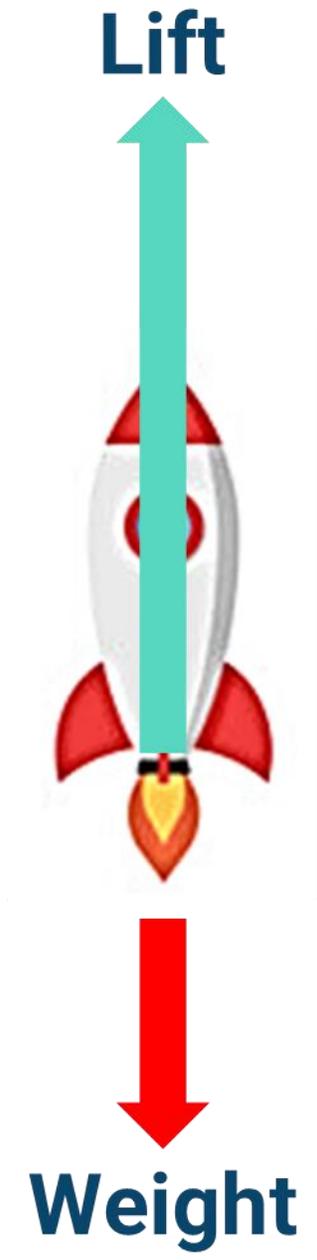


Figure 2 Rocket Lift vs Weight

- **Engineering Process:**

- Figure 3: Our designs aren't perfect the first time – we use the engineering process to work towards the best solution.

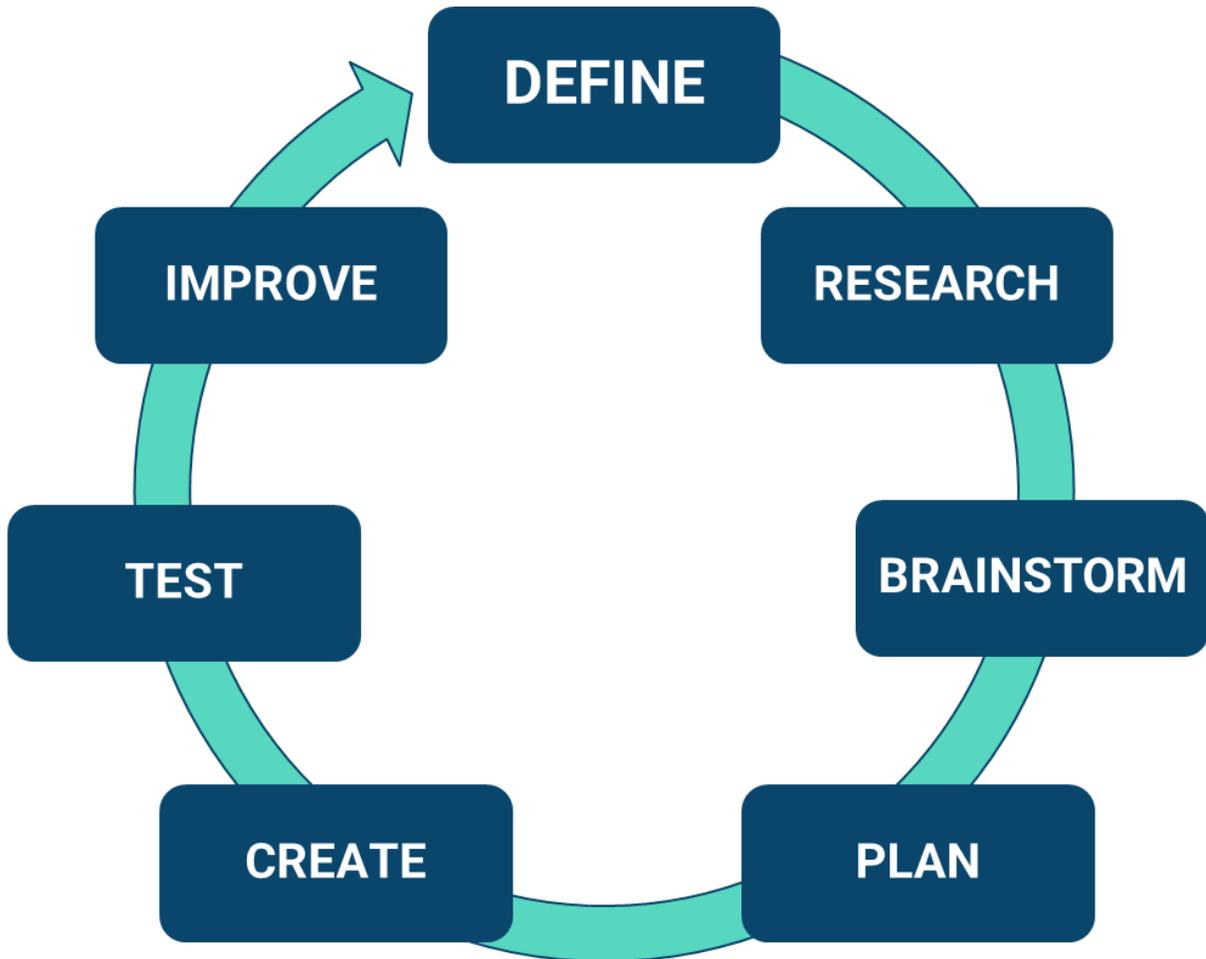


Figure 3 Engineering Process

Procedure

1. Rocket Body:

- a. Cut a sheet of construction paper into quarters.
- b. Roll a piece into a narrow tube and tape.
 - i. The tube should fit over the large straw loosely but with minimal gapping (approx. $\frac{1}{2}$ ").
- c. Seal the tip of the rocket with tape.

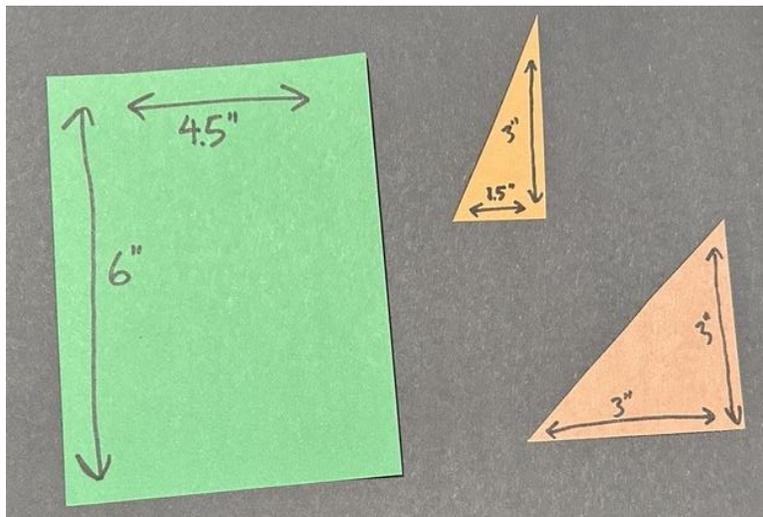


Figure 4 Cut Paper



Figure 5 Create Rocket Body

2. Rocket Control Surfaces:

- a. Cut another piece of construction paper or cardstock into right triangles (x3-4) of any matching size (see examples in figure).
 - i. Larger = heavier but better control; smaller = lighter but worse control. Depending on time and student abilities, you may choose to allow students to experiment with different sizes (engineering design process).
- b. Tape triangles around the base of the rocket.

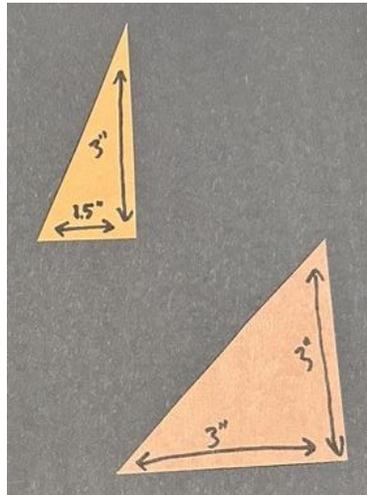


Figure 6 Create Fins

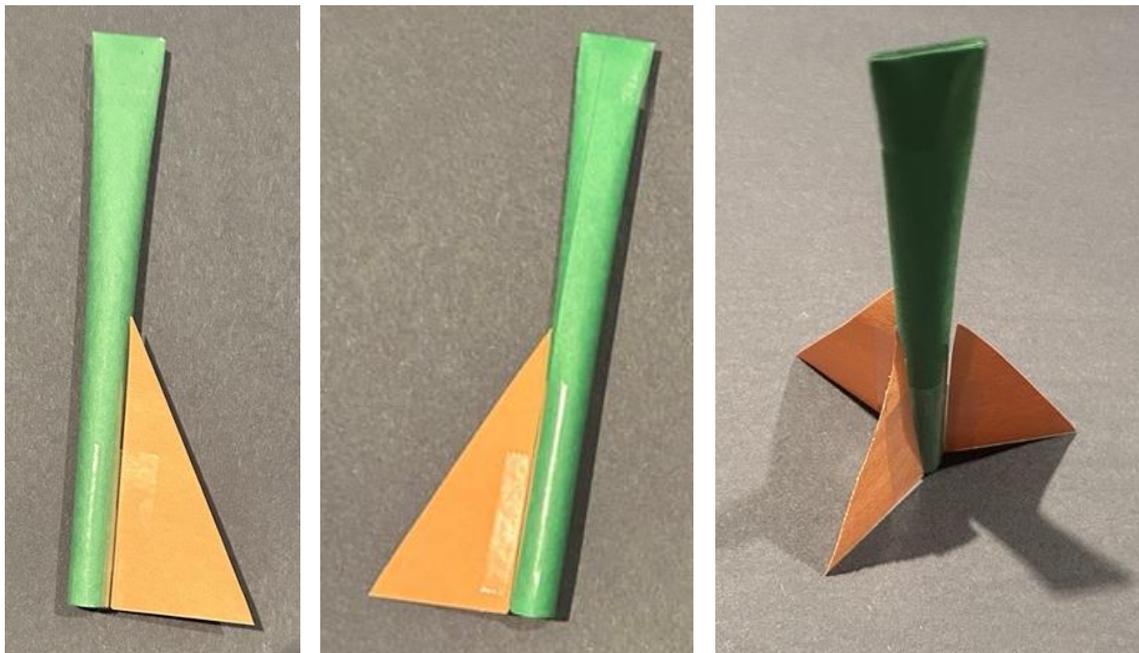


Figure 7 Attach Fins

3. Rocket Engine:

- a. Cut a straw into halves or thirds (approx. 3" lengths).
- b. Cut the end of the straw into an angle (the sharp point helps insert it into the juice pouch).
- c. Chug the juice pouch!
- d. Replace the juice pouch's straw with the larger straw.



Figure 8 Insert Straw

4. Rocket Launch:

- a. Inflate the juice pouch through the large straw.
- b. Lay the inflated pouch on the ground with the straw sticking up
 - i. You may need to bend the pouch and/or use tape to properly angle the rocket for launch. It doesn't need to be perfectly vertical, but it shouldn't be horizontal.
- c. Place the rocket base over the straw.
- d. Stomp or punch the juice pouch to create thrust!
- e. Measure the distance the rocket flew (feel free to have a competition!)



Figure 9 Inflate Juice Pouch

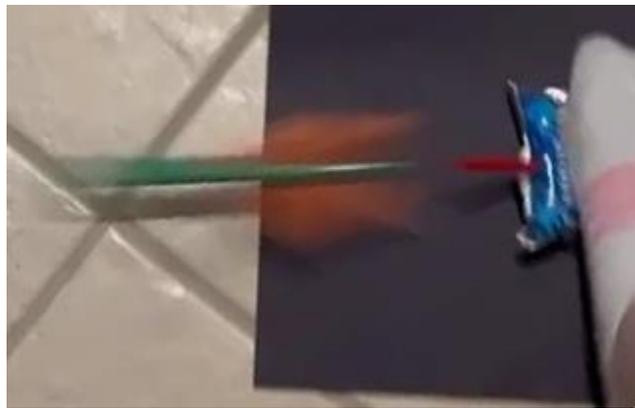
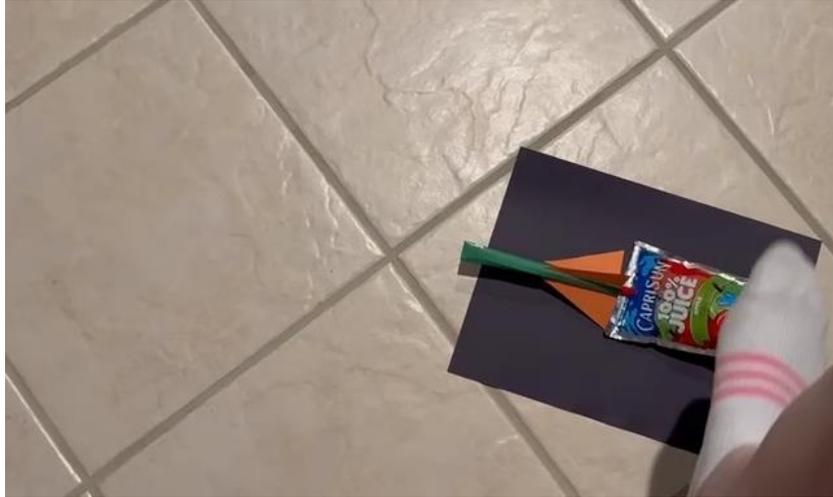


Figure 10 Stomp Pouch to Launch



Figure 11 Check How Far It Flew!

Tips & Tricks

- **Time Savers:**
 - Pre-make tubes for age, time, or ability limitations
 - Pre-cut triangles for fins, or allow students to cut them
 - Pre-tear strips of tape and hang them at the edges of the tables

- **Problem-Solving:**
 - Rocket launching into ground?
 - Gently lift the rocket with your fingers to guide its takeoff direction.
 - Leaking air?
 - Tape around the base of the straw to seal its interface with the juice pouch.
 - Not enough air pressure?
 - Reduce the diameter of the rocket body.
 - Not launching far enough?
 - Reduce weight by using less tape and/or smaller fins.

Juice Pouch Stomp Rocket

Name: _____

Student Guide

Date: _____

☒	Steps	Notes
	<u>Create your rocket body</u>	
<input type="checkbox"/>	Cut sheet of paper into quarters	Save the extra pieces!
<input type="checkbox"/>	Roll a paper into tube (roll long edge) and fasten with tape	Compare to straw to ensure the paper tube fits
<input type="checkbox"/>	Cover tip of rocket with tape to seal off air from escaping	
	<u>Create your rocket controls</u>	
<input type="checkbox"/>	Cut excess paper into right triangles (x3-4)	May be any matching size
<input type="checkbox"/>	Tape triangles evenly around base of rocket (opposite from sealed end)	Place right angle at base so rocket can stand
	<u>Create your rocket engine</u>	
<input type="checkbox"/>	Cut end of straw at an angle to make a sharp tip	
<input type="checkbox"/>	Drink your juice pouch!	
<input type="checkbox"/>	Replace juice straw with larger straw	Insert the sharp end into the juice pouch
	<u>Launch your rocket!</u>	
<input type="checkbox"/>	Blow up juice pouch through straw	
<input type="checkbox"/>	Lay pouch on ground with straw sticking up	
<input type="checkbox"/>	Place rocket base around straw	May need to lean rocket on fingers to gently aim away from the ground
<input type="checkbox"/>	Stomp or punch juice pouch to create thrust	

Revision History

Revision	Date	Notes
A	Feb. 2026	Initial Release