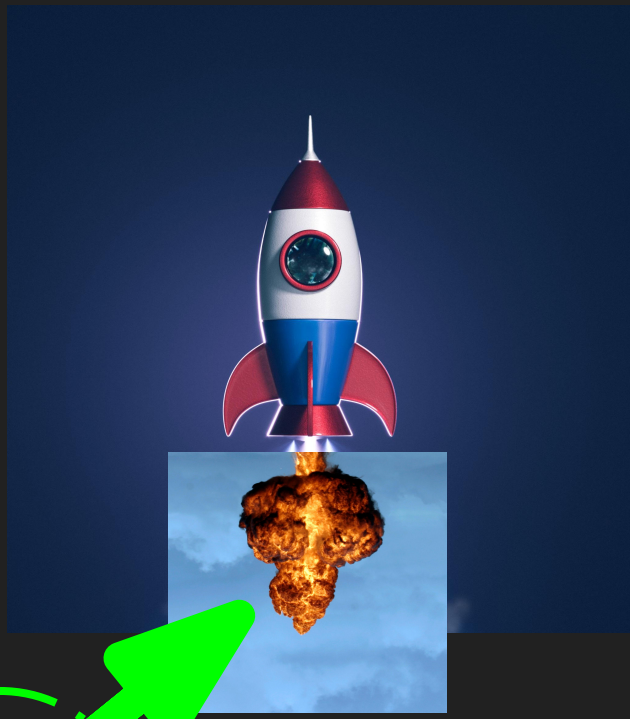
Let's Fly Sky High

By: Fifth Grade Students
2025-2026

Introduction

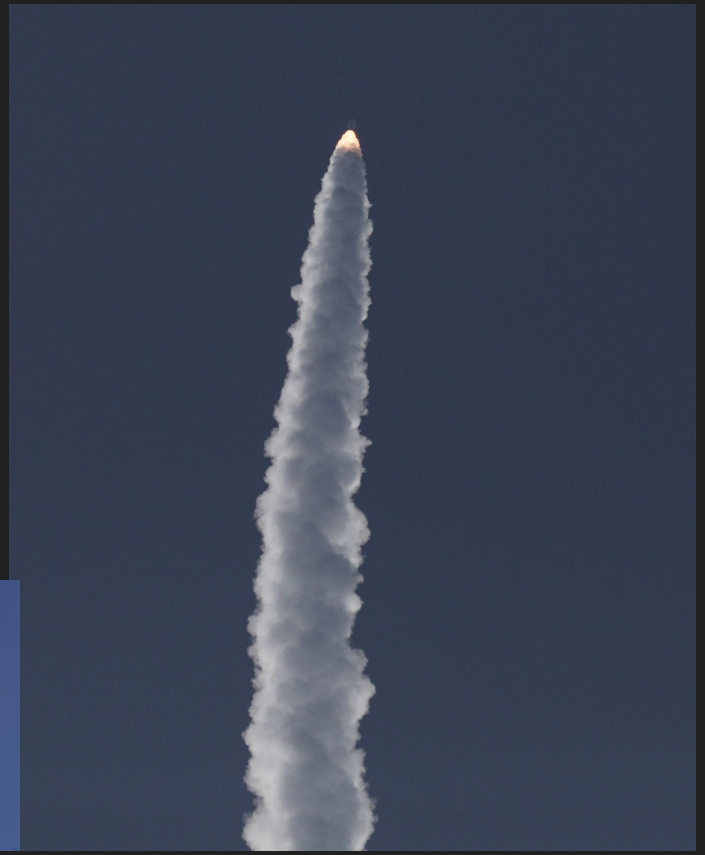
A rocket is a vehicle that blasts off using thrust. In our experiment we want to figure out what combination of vinegar and chalk it will take to make the biggest reaction and make the most thrust. We want to do this because we want to see how far the rocket goes up measuring in meters and centimeters. We will change the amount of chalk and vinegar in the reaction.



This is not what it will look like

Our investigation

What amount of chalk and vinegar will make a rocket fly the farthest up in meters?

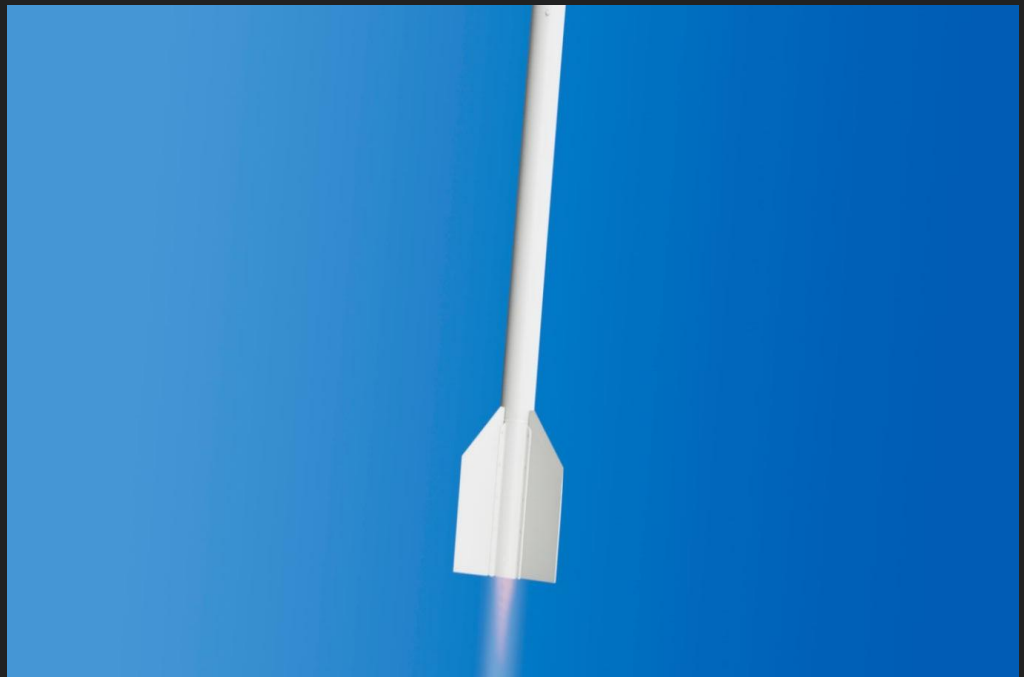


Research

Putting the chalk in the vinegar starts the chemical reaction as the vinegar starts to dissolve the chalk, then it forms carbon dioxide which starts to fizz and makes the rocket launch up. The chemical reaction has to escape through a cap that makes it blast off. That is how the rocket launches up. The gas escaping is rocket thrust and rocket thrust is caused by pressure and gases which go from the back of the rocket and pushes against the cap that moves the rocket up by popping off the cap on the bottom then the explosion .

OUR HYPOTHESIS!

If you put chalk and vinegar in a rocket will it fly? We are measuring how far it flies in meters. Then think this will happen because the chemicals mix to make a reaction. Because think one piece of chalk and 5 ml of vinegar 1 chalk will make it fly the farthest because more vinegar will make it dissolve faster making it go farther.



Materials needed to this experiment

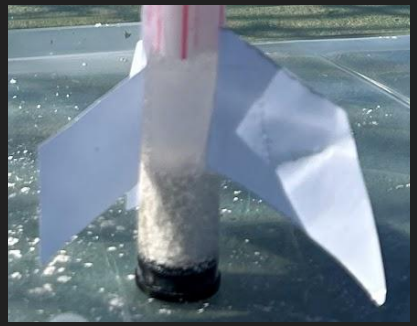
- Chalk
- Vinegar
- 1 ml pipette
- Plastic tube with cap
- Straws
- Tape
- Meter sticks
- Paper
- Scissors

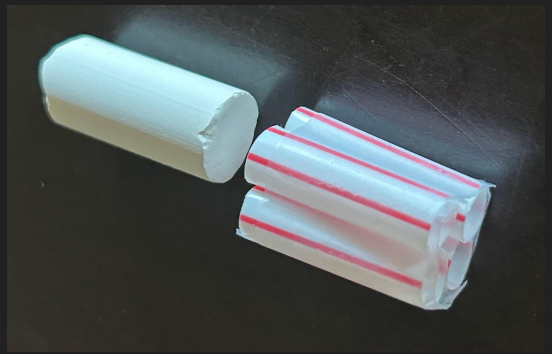
Procedures

Step 1: Attach meter sticks to fence to record the rocket height.

Step 2: Create three identical fins and tape them to the rocket body.

Step 3: Cut a straw into four 2 cm pieces then tape them together in a square.





Procedures part 2

Step 4: Pour the amount of vinegar in the rocket body. Put the straw square in the rocket body.

Step 5: Then you put the chalk on the straw contraption, slowly!

Step 6: Finally, put the cap on the top of the rocket, then go to the launching space and flip it and put it down. Then watch it “FLY SKY HIGH”!!

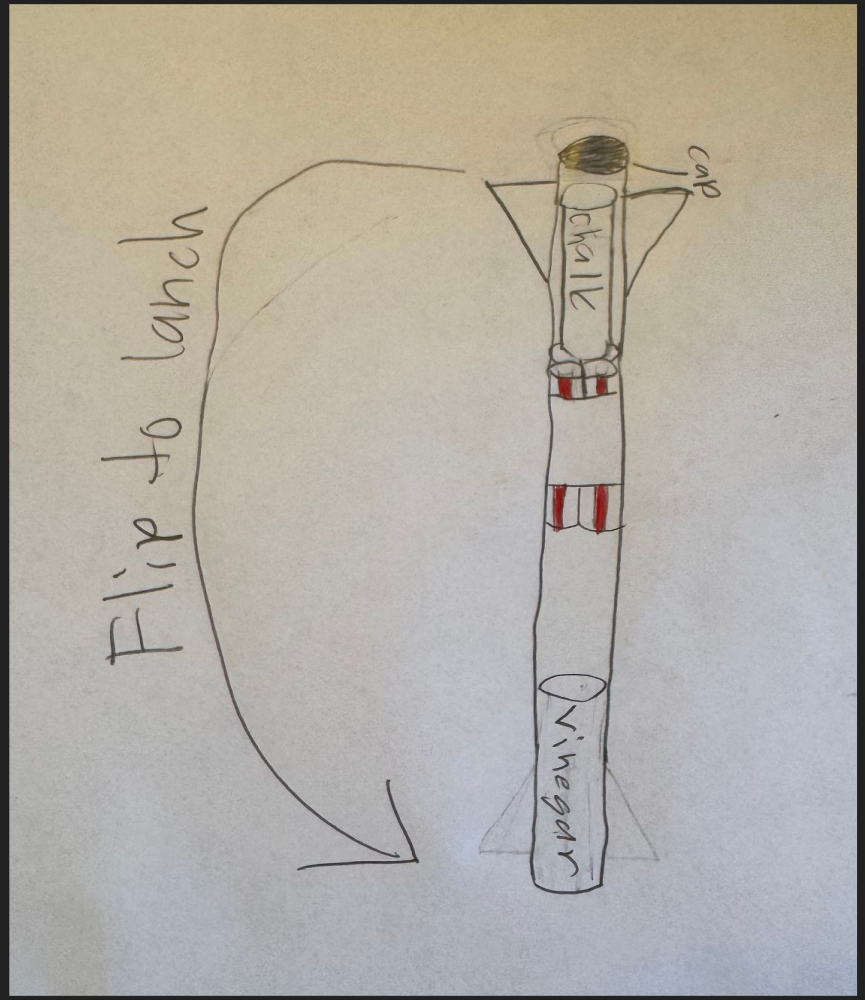
Step 7: Repeat launches with different amounts of vinegar and chalk.

Procedures part 3

Rocket assembly →

The independent variables were: the amount of vinegar and chalk.

The dependent variables were: the height and the time.



Our observations

Date: 9-20-25

Time: 8:55 AM

- Qualitative: I see that the chalk is rising to the top! It is also bubbling and the chalk disintegrating and making pressure that makes it launch.

-Quantitative: 1 chalk and 2 mils flew above our meter sticks so we estimated that it was 4.13 meters in the air.

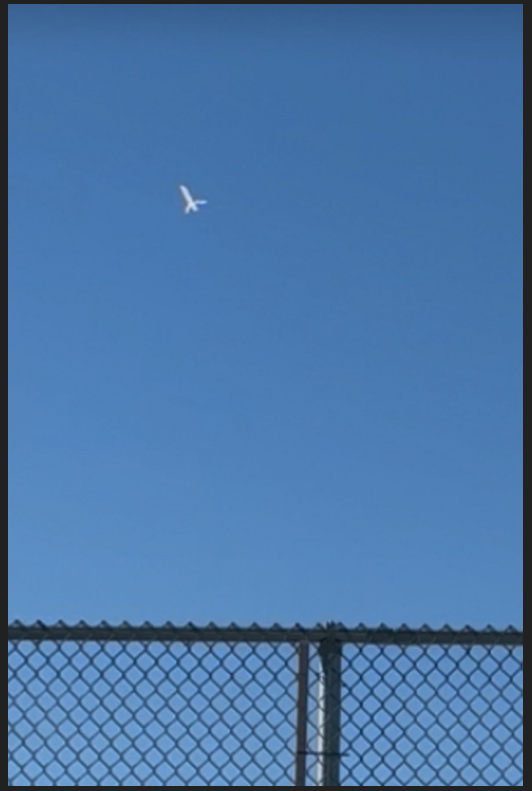
Our Results

Chalk (2cm pieces)	Vinegar (ml)	Time to launch (min)	Height (m)
1 piece	1 ml of vinegar	test	test
1 piece	2 ml of vinegar	2.563	4.13
1 piece	3 ml of vinegar	2.51	3.78
1 piece	4 ml of vinegar	1.506	1.47
1 piece	5 ml of vinegar	Dud - no launch	Dud - no launch
0.5 piece	1 ml of vinegar	Dud - no launch	Dud - no launch
0.5 piece	2 ml of vinegar	1.56	1.18

Results

My results were interesting...

The rocket that flew the highest used two milliliters of vinegar and one piece of chalk. That was surprising because we thought that more vinegar would make it fly higher.



Conclusion

What amount of chalk and vinegar will make a rocket fly the farthest up in meters? Our conclusion is that the highest we could launch a very small rocket up is 4.13 meters high using 2 ml of vinegar and 1 chalk.

I think our hypothesis is wrong because 5 ml of vinegar and 1 chalk was too heavy and weighed the rocket down. We observed that 5 ml of vinegar and 1 chalk did not launch. In further investigations you could you could change the weight of the rocket, the type of fins and and the size of of the rocket to see if it launches higher.

Conclusion

Does more chalk and vinegar make a rocket fly higher? No, during my investigation, I found that if you add more vinegar and chalk it will way the rocket down, if you add more vinegar it might way the rocket down. Before I conducted my experiment, I thought if I added more vinegar, it would launch the highest because more vinegar would make the chalk dissolve faster and make more bubbles, going higher.

After conducting my experiment, it was obvious that less vinegar will make the rocket fly the highest. By comparing the highest amount of vinegar to the or lowest amount of vinegar the bigger amount flew higher by an astonishing 1.057 meters.

During my investigation I learned that the more vinegar will decrease how high a rocket flies. I think this is because the vinegar weighed the rocket down so it did not lunch very high.

Citations

1. Chemical Reaction Rockets, Carolina Biological Supply Company, Burlington, NC, USA, 2018, pp 9-26.
2. What is Newton's second law of motion by Dr. Binocs. (https://www.youtube.com/watch?v=8o3j1wpabes&list=PLmJ33rwb1zZaX3-Vw_u_PB6Wf_bZDSise&index=2)
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5. Science Fun.ORG (https://www.sciencefun.org/kidszone/experiments/crazy-chalk-chemical-reaction-science-experiment)