

Alka-Seltzer Rockets

How to Build Your Own Rocket

Before you start:

Building this rocket will help you to understand how real rockets propel themselves into space. **ASK AN ADULT TO HELP YOU!**

What you will learn:

You can use baking soda and vinegar to propel an object across the floor. The object, in this case your rocket, will slide across the floor by the chemical reaction created from the combination of baking soda and vinegar.

A scientist from the early 1700's, named Isaac Newton, came up with an idea about how things move through space. He said a force pushing on an object will create a second force, with the same strength as the first, going in the opposite direction. This idea is now called Newton's Third Law of Motion.

National Science Education Standards:

Standard A: Understandings about scientific inquiry

Standard B: Motions and forces

Standard B: Transfer and energy

Standard E: Abilities of technological design

National Technology Education Standard:

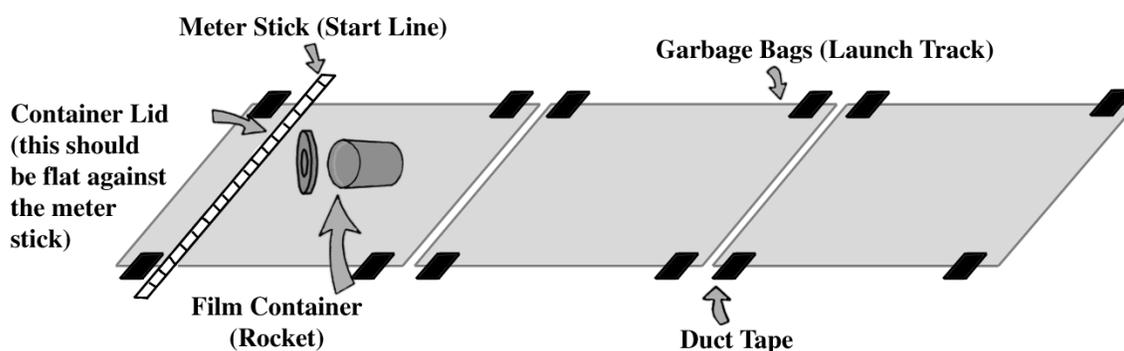
NT.K-12.3 Technology Productivity Tools

What you need:

- Yard stick
- Measuring tape (several feet long)
- Stopwatch (watch with a second hand)
- Baking soda
- Vinegar
- Clear plastic film container (lid snaps closed from inside lip of canister, the black and gray canisters do not work as well)
- Large garbage bags
- Duct tape
- Paper towels

Directions:

1. Tape several large garbage bags to the floor, creating a runway, see diagram.
2. Tape a yardstick to the floor on the narrow side. This can be used as the start line for your launch track.



3. Put a small amount of baking soda into the canister.
4. Add enough vinegar to just cover the baking soda and quickly replace the lid. You can also use Alka-Seltzer tablets and water.
5. Set the rocket on the start line, one end of the plastic bag, with the cap facing you. **BE CAREFUL, IMPROPER USE OF YOUR ROCKET CAN CAUSE EYE INJURIES.**
6. Time the rocket to see how long it takes from launch to when it comes to a complete stop.
7. Place a marker along side the runway where the rocket ends and measure the distance to the final resting point of the rocket.
8. Does the amount of baking soda and vinegar used change the distance that the rocket goes? Try different amounts (**WITH ADULT PERMISSION**) and record you results.

Evaluation:

1. Was the student able to get the canister to travel using the baking soda and vinegar propulsion system?
2. Was the student able to record the results and answer the questions?
3. Was the student able to make any conclusions about the amount of baking soda used and the distance the canister rocket traveled?

Extensions:

1. Does the amount of baking soda used affect the length of time the rocket is propelled? How about the amount of water used?
2. If weight were added to the canister (such as clay to the outside of the canister), would that affect the distance and time the rocket was propelled? Why?
3. What role does gravity play in rocket launches? How does a real rocket get beyond the pull of Earth's gravity?

CAUTION: There is danger of eye or facial injury if rockets are launched upward instead of horizontally. The canisters sometimes discharge prematurely. If canisters are launched upward (vertically), safety glasses should be worn and the activity should be under strict adult supervision.

Name _____

Team # _____

Alka-Seltzer Rocket Data Sheet

Instructions:

- Your team will use some baking soda and vinegar to propel your rocket canister.
- Measure the time each rocket takes to come to a complete stop.
- After each test, measure the distance your rocket traveled.
- Use the same amount of baking soda and vinegar for the first 4 trial and average the distance traveled and the time of each launch.
- Finally, test the rockets with different amounts of baking soda and vinegar and time the last 4 trials.
- How do they compare to the first trials?
- Were there any other factors that you needed to keep constant?

Rocket Number	Amount of Baking Soda	Amount Vinegar	Distance Traveled (inches or cm)	Time (seconds)
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1				
2				
3				
4				
Average of Rows 1-4				
5				
6				
7				
8				

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Student Sheet

Newton's Third Law:

If one object exerts a force on a second object, the second object exerts an equal but opposite force on the first.

Directions:

Answer the following questions based on what you learned from your rocket experiments.

1. What do you think was taking place inside the canister with the baking soda and vinegar?
2. Why do you think the canister cap blew off?
3. How is this similar and/or different from a real rocket?
4. How did using different amounts of baking soda effect the time and distance traveled by the canister?
5. How does Newton's Third Law of Motion relate to the rocket launching?