

OH WOW! Moment

Activity by Audra Carlson, Education Manager

Grade Level: suitable for all ages

Alka-Seltzer Rockets

AT A GLANCE:

Kids can create a chemical reaction that launches a homemade rocket.

STUDENTS WILL BE ABLE TO:

Demonstrate the process of science inquiry by posing questions and investigating phenomena through language, methods and instruments of science.

BACKGROUND INFORMATION:

Newton's Third Law of Motion states that for each action, there is an equal and opposite reaction.

PRINCIPALS:

Students use a simple chemical reaction to power a homemade rocket.

MATERIALS:

- Index card
- Film canister, or other small plastic container with a pop-top lid
- Alka-seltzer tablets
- Water
- Markers, crayons or stickers
- Scissors
- Tape

PROCEDURE:

1. Decorate the index card. This will form the body of your rocket.
2. Roll the index card into an 8-inch-tall tube. Slide an empty, film canister into the tube so that the canister opens at one end of the tube. Securely tape the paper tube to the canister. You do not want these two parts to separate.
3. Now tape the 8-inch-long seam of the paper tube.
4. Cut two triangular, paper fins and tape them onto the rocket.
5. What is the function of the rocket fins?
6. Make a small paper cone and tape it to the top of the rocket if you would like a nose cone.
7. What is the function of the nose cone?
8. Hold the rocket upside down and add water to the canister to one-quarter full.
9. Add half a tablet of alka-seltzer to the film canister and quickly snap on the lid.
10. Place the rocket on the ground, lid down. Stand back and count down while you are waiting for launch!

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What's Happening?

In this classic experiment, carbon dioxide gas builds up so much pressure the lid is forcibly launched. With an Alka-Seltzer tablet, the CO_2 is produced as a result of a chemical reaction. With the soda, the CO_2 is produced as a result of vigorous shaking. This provides a good contrast between a physical and chemical change.

The fizzing you see when you drop an Alka-Seltzer tablet in water is the same sort of fizzing that you see when you mix baking soda and vinegar. The acid mixes with the sodium bicarbonate (baking soda) to produce bubbles of carbon dioxide gas. If you look at the ingredients of Alka-Seltzer, you will find that it contains citric acid and sodium bicarbonate (baking soda). When you drop the tablet in water, the acid and the baking soda react to produce carbon dioxide gas. The gas keeps building up until finally the top pops off. The lid of the canister is the path of least resistance for the gas pressure building up inside, so it pops off instead of the stronger sides or bottom of the canister bursting open.

We can thank Sir Isaac Newton for what happens next. When the build up of carbon dioxide gas is too great and the lid pops off, **Newton's Third Law** explains why the film canister flies across the room: for every action there is an equal and opposite reaction. The lid goes one way and the film canister shoots out of the tube in the opposite direction.

Try this:

- Experiment using different amounts of water or alka seltzer to see how it affects the height of the rocket.
- Experiment to see how the weight of the rocket affects the height it travels keeping the amount of water and Alka Seltzer constant each time.
- Measure the height of your rocket's launch, make a table to interpret your modifications. And their outcomes.

What action happened inside the film canister?

What do you notice or observe?

What conclusions can you make?

What can you do differently next time?