

ALKA-SELTZER ROCKET

A **chemical reaction** is a process in which a substance undergoes a change to turn into a new substance, such as changing from a liquid to a gas.

Chemical reactions change the structure of matter, which can help us do some extraordinary things. Scientists use substances including water and aluminum to create a chemical reaction powerful enough to launch a rocket out of Earth's gravity. You can create your own version of this using a simple Alka-Seltzer tablet as fuel. When conducting this investigation, make sure to take safety precautions such as wearing eye protection and ensuring the launch area is in a safe and open area outside.

GOAL

Create a rocket that can shoot into the air powered by a chemical reaction!



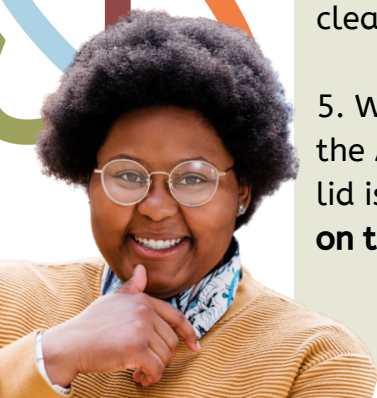
MATERIALS

Index card or cardstock
Tape
Film canister
Scissors
Water
Alka-Seltzer tablet
Eye protection
An outdoor area with open space

TO DOs

1. **Flip the film canister upside down so the lid is on the bottom.** Wrap a piece of the index card around the canister and tape it to cover the canister.
2. Cut THREE triangle-shaped fins out of an index card and tape them to the bottom of your rocket (the side with the lid).
3. Create a nose cone for the rocket! Cut a circle out of one of the index cards. Cut a triangle piece out of the circle (it should look like a slice of pizza). Now that a piece is cut out, you can twist the circle into a cone shape. Tape the cone in place and tape it to the top of your rocket.
4. Fill the canister with water half full. Take it to an open space outdoors and clear of any ceilings or obstructions when you look up!
5. When you are ready to shoot your rocket, put on your eye protection, place the Alka-Seltzer tablet into the canister and snap the lid on tight. Make sure the lid is on tight and sealed well or you will only get a small fizz. **Stand it upright on the ground on a flat surface with the lid on the bottom.**

Stand back and watch!



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HOW DOES IT WORK?

As the Alka-Seltzer tablet reacts with the water, it creates bubbles of carbon dioxide gas. When this gas builds up in the container, it creates pressure inside the container that causes the lid to pop off.

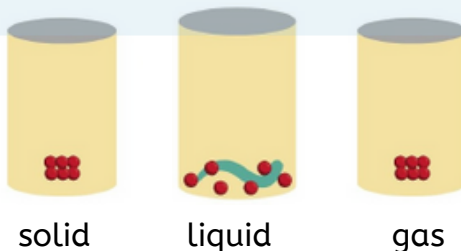
Newton's Third Law of Motion says that every action has an equal and opposite reaction. When the air rushes downward out of the container, the container shoots up in the opposite direction.

WHY DOES THE GAS EXERT SO MUCH PRESSURE?

The tablet starts out as a **solid**. Its molecules are packed tightly together in a compact form and they can't move around very much.

When the tablet dissolves in the water, part of it becomes **liquid**. The liquid molecules loosen up and flow more freely.

As the ingredients in the tablet dissolve and react, gas molecules are also created. These molecules spread out and bounce around very quickly. As the amount of **gas** in the container increases, more molecules start to bounce off the walls of the container, creating pressure until the lid eventually pops off!



REAL ROCKETS WORK THE SAME WAY!

Big rockets also go up by releasing gas. Rockets carry tanks of fuel that are kept in liquid form at very low temperatures. Because there's no air in space, they also carry tanks of oxidizer that provide the oxygen needed to burn the fuel. When the rocket fuel and oxidizer are mixed and burned, they turn into gas. As the gas is released from the bottom of the rocket, the rocket goes up!

