

Educator Guide to

# Chemistry



# Concepts

A workshop presented  
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# ALKA SELTZER ROCKETS

## OBJECTIVE:

Students will create a chemical reaction to test Isaac Newton's Third Law of Motion.

## MATERIALS:

- 1/4 of an Alka Seltzer table
- FUJi® 35mm film canister (other film canisters do not work as well for this activity)
- Warm water

## NOTE:

Do this activity outside or in an area with high ceilings. Also be sure not to stand over the rocket since it will be shooting up in the air.

## TO DO:

Fill the film canister 1/4 full with warm water. Drop in 1/4 table of Alka Seltzer - no more. Not only will this help you to conserve tablets enabling you to do more launches, this amount will also be strong enough to launch the rocket 10 to 30 feet in the air. Snap the lid tightly into the canister, turn it over (so the lid is on the bottom) on a hard surface and stand back.

## WHAT'S GOING ON?

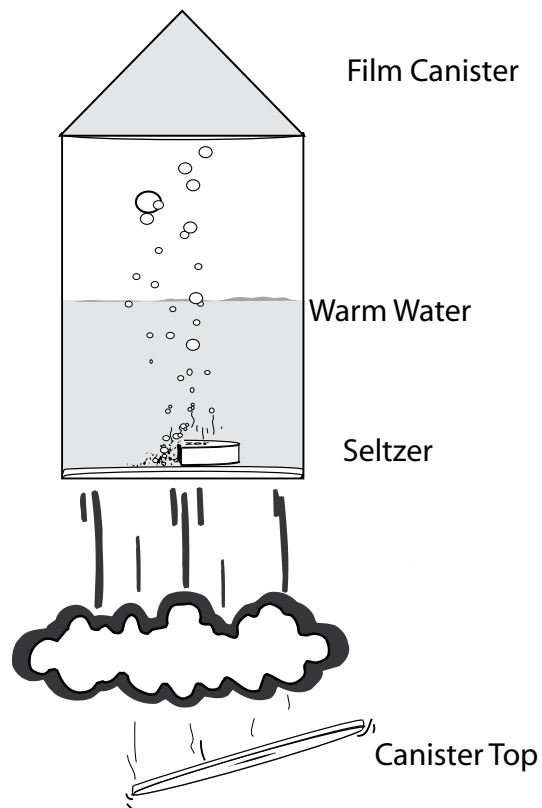
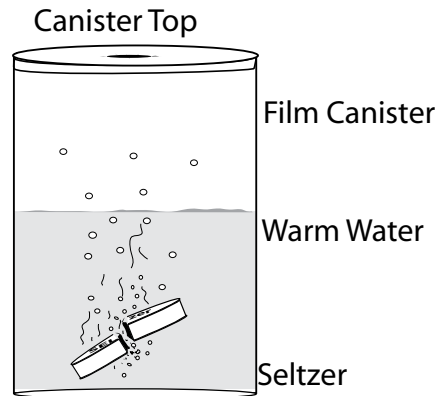
This activity is an example of Newton's Third Law of Motion that states "For every action there is an opposite and equal reaction." If you look at the ingredients for Alka Seltzer, you will see that it contains citric acid and sodium bicarbonate (baking soda).

When you drop the tablet in the water, the acid and baking soda react to each other and build up gas pressure inside the film canister. Gas has the ability to expand and fill its container completely.

In this case, the gas keeps expanding in the film canister until enough pressure is built up to blow the canister from its lid. The reaction is the launching of the canister up in the air.

## TAKING IT FURTHER

If you vary the temperature of the water, your rocket will shoot to different heights. The warmer the water, the higher it will go. Also try different amounts of Alka Seltzer and watch how it changes your rocket.



# RISING RED REACTION

## OBJECTIVE:

Students will combine different ingredients to learn about chemical reactions and pressure

## MATERIALS:

- 12 ounce (355 ml) glass soda bottle
- 10 inch (25 mm) round baking pan
- 1 tbsp. (15 ml) baking soda
- 1 cup (250 ml) vinegar
- Red food coloring

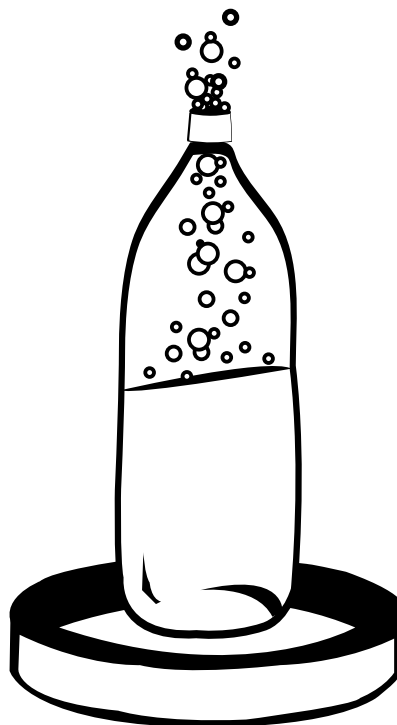
## TO DO:

Place the soda bottle in the pan. Put one tablespoon of the baking soda into the bottle. Color one cup of vinegar with the red food coloring, and pour the liquid into the bottle. Move back a few steps.

## WHAT'S GOING ON?

The red foam spewed out of the bottle because the baking soda reacted with the vinegar to produce carbon dioxide gas. This is because baking soda is a base, while vinegar is an acid.

An acid is a compound that donates protons (positively charge atomic particle) in a reaction, while bases are compounds that accept these protons. Acid and bases react quickly to each other when mixed. In this experiment, because the proper amounts of acid and base were not used, there was an eruptive reaction. The gas expanded in the bottle and built up enough pressure to force the liquid out of the top of the bottle. The mixture of the gas and the liquid produced the foam.



## KEY WORDS

Teachers, the following glossary terms are used in the lessons above as well as the lessons that will be covered during your workshop. It will be beneficial for your students to know these words in order to get the most out of their field trip.

**CHEMISTRY:** Study of matter and the changes it undergoes.

**GAS:** A substance which can expand indefinitely and completely fill its container.

**LIQUID:** Free flowing substance that has a set volume, but not a set shape.

**MATTER:** The substance of which a physical object is made.

**PRESSURE:** The force exerted over an area.

**REACTION:** Response to a stimulus or influence.

**SOLID:** A substance with a set volume and shape.