

Week 3: Fireworks Fun



Ever wonder how Fourth of July fireworks work? It's all chemistry! A chemical reaction launches fireworks into the sky, and their colors are created when chemical elements and compounds are heated and emit different colors of light. Oooh and aaah over these fireworks-related activities—no fire needed!

experiment

BOTTLE ROCKETS

Materials

Small plastic bottle

Cork

Toilet paper or paper towel tube

Cardboard

Tape

Baking soda

White vinegar

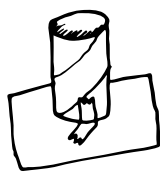
Toilet paper

Construction paper

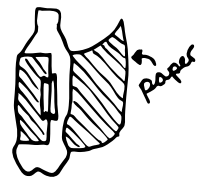
Scissors

Markers or crayons

Measuring cup and spoons



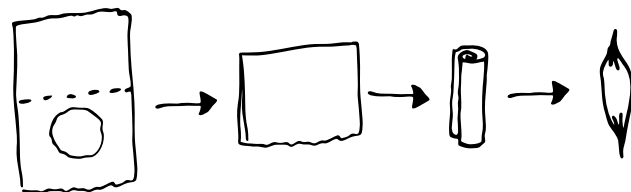
Make a launching pad by taping a toilet paper tube perpendicular to a piece of cardboard so it's pointing up.



Turn a plastic bottle into a rocket by wrapping a piece of construction paper around it, creating a tube, and taping it into place. Make sure there's no paper around the opening of the bottle, which is the base of your rocket.



Tape triangular fins near the rocket base, and make the top by cutting a circle and taping it into a cone shape. Use markers or crayons to decorate the rocket if you'd like. Wrap tape around a cork so that the cork fits into the bottle opening.



Pour 1/4 cup of vinegar into the bottle. Put 1 teaspoon of baking soda on two squares of toilet paper and make a "sausage" by rolling it up and gently twisting the ends.

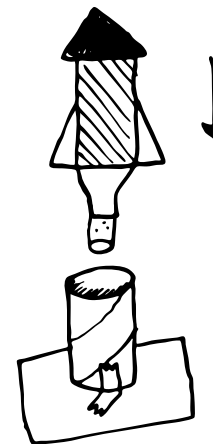


To launch, place the launching pad on the ground outside and put on your eye protection. Drop the fuel "sausage" into the bottle, insert the cork, turn the bottle upside down and place it on the toilet paper tube. Step away and watch it fly!

Safety note



Do this experiment outside, and wear eye protection. Step away quickly once you've placed the rocket on the launching pad.



What's happening?

When you combine the baking soda and the vinegar, the chemical reaction created a gas called carbon dioxide. Carbon dioxide is invisible, except as the bubbles of gas you may have noticed when the vinegar and baking soda mixture began to fizz. As the gas is formed, pressure builds up, causing the cork to pop out and send the bottle rocket shooting upward.

Game on!

Challenge friends to see whose rocket can launch the highest. Experiment with different amounts of vinegar and baking soda to see what happens.

Tip

Fresh baking soda works best.

More ways to play with fireworks

Make milk fireworks: Pour some milk onto a plate, add drops of food coloring, dip a toothpick into dish soap and touch it to the center of the plate. The dish soap disrupts the milk's equilibrium. The food coloring shows how the milk molecules are rearranging themselves as they try to return to equilibrium.

Design and explode virtual fireworks in the Fire Colors interactive in MSI's *Science Storms* (msichicago.org/sciencestorms)

Learn fireworks history and science at pbs.org/wgbh/nova/fireworks/

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