



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

make a lemon juice rocket - you'll want to be outside for this one! It could get messy!



Supplies Required:

- Graphic organizer
- Soda bottle
- Cork
- Tablespoon of baking soda
- Tape
- Straw
- Water
- Lemon juice
- Safety glasses/sunglasses
- Toilet paper

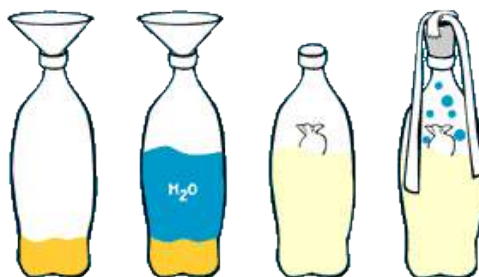
Video

Let's Talk About Chemical Reactions video: <https://tinyurl.com/y3df8mya>

Overview

When acids and bases mix together, they form carbon dioxide! In this experiment, we'll use lemon juice as our acid and combine it with baking soda, acting as our base, to create carbon dioxide to launch our cork "rocket!" What do you think is happening inside the bottle that makes the cork pop off?

If you change the amounts of lemon juice and baking soda, will the outcome change? Can you make the cork launch higher by adding more baking soda or lemon juice? What is your hypothesis, or guess?



Instructions

1. **Problem** - How can we launch the "rocket" cork out of the bottle?
2. **Hypothesis** - Make a prediction! What will happen when we add baking soda with lemon juice? Draw your prediction and share what you think will happen using the sentence starter, "I predict that..."
3. **Experiment** - Test it out and make observations!
 - Turn your bottle upside down and grab one straw and place it on one side of the bottle with half of the straw on the bottle and the other half off of the bottle to create a stand.
 - Tape down the straw and do the same thing for the other 2 straws aligning them the same making a stand for the bottle
 - Now place your toilet paper squares down on a flat surface
 - Add your tablespoon of baking soda over the toilet paper squares and create a little pouch
 - Then pour water and lemon juice into the plastic bottle
 - Put your safety glasses on
 - Grab your toilet paper pouch in one hand and cork in the other.
 - **Quickly**, put the pouch inside the bottle and cover the bottle with the cork
 - Flip the bottle onto its stand, **back away**, and observe what happens
4. **Analysis** - Based on your observations what do we now know? What happened when we placed the baking soda pouch into the lemon juice and water mix? Why do you think that happened?
5. **Conclusion** - Was your hypothesis correct or incorrect? Share what you learned using the sentence starter, "my hypothesis was (in) correct because..."

Additional Resources

Think About It! What do you think would happen if you tried the experiment again with more or less baking soda and lemon juice? Can you make your rocket launch higher?

1. Take a deeper dive into acids and bases, learn about pH: <https://tinyurl.com/rlo5prd>
2. Learn about acid and base reactions in daily life: <https://tinyurl.com/yauzbkca>

Share It Out

Share on social media: Take a video of your rocket and explain to your viewers what is happening.

#LemonJuice Rocket
#ProjectExploration
#STEMatHome

For more activities like this one, go to www.projectexploration.org/stemhome. If you're interested in learning more about Project Exploration and our free events, programs, and activities, please find us on social media and be sure to follow!



Call or text us for help: 312-772-6634

www.projectexploration.org