Bicarb Soda & Vinegar Rockets

Scouts VICTORIA

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Sections

Joey Scouts
Cub Scouts
Scouts
Venturer Scouts
Rover Scouts

Challenge Areas

COMMUNITY
CREATIVE
OUTDOOR
PERSONAL GROWTH

Scout Method Elements

COMMUNITY INVOLVEMENT
LEARNING BY DOING
NATURE AND THE OUTDOORS
PROMISE AND LAW
PERSONAL PROGRESSION
PATROL SYSTEM
SYMBOLIC FRAMEWORK
YOUTH LEADING, ADULTS SUPPORTING

SPICES Growth Areas

CHARACTER
EMOTIONAL
INTELLECTUAL
PHYSICAL
SOCIAL
SPIRITUAL

The Adventure

With your patrol or unit try designing and launching your own bottle rockets, powered by chemistry, to investigate some of the laws of Physics.

Plan

1. Investigate the science behind gravity and rocket flights. This video might help you get started. Can you explain how rockets work to someone else?
2. Investigate the reaction between bicarbonate of soda and vinegar and how you might use this to power a rocket.
3. Collect the materials you will need for the rocket construction and launching. Make sure to communicate with your unit or patrol if anyone need to bring recycled materials to make your rockets.
4. You might want to make a prototype and then think about if you want to make any changes to improve aspects such as aerodynamics and the launch system.
5. Hypothesise what will happen when you launch the rocket. Why do you think this will happen?
6. Read the safety information and discuss with your leaders or another appropriate adult what safety equipment, precautions, and supervision may be required. Ensure that you have these safety measures in place before starting the 'Do' section.
7. Gather the equipment that you will need to make your rocket. You will need the following items: 4 straws, a plastic bottle, sticky tape, paper, decorations and textas, vinegar, bicarbonate of soda, paper towel or toilet paper, and a cork that fits in the mouth of the bottle.

Do

1. Tape 4 straws to the neck of the bottle to create a stand for the rocket when launching. Make sure that your bottle will stand.
2. Design and construct your rocket out of a bottle before preparing for launch. Make sure to include some great decorations and a paper cone on top of your bottle. You might like to sketch your design on a bit of paper with your patrol or unit before start building your rocket.
3. Half fill the bottle with vinegar.
4. Place a tablespoon of bicarbonate of soda into the centre of a piece of paper towel or toilet paper and roll it up, twisting the end to contain the bicarbonate of soda.
5. Place the paper towel/toilet paper into the bottle but let the neck of the bottle hold the towel rather than pushing it into the vinegar.
6. Put a cork in the mouth of the bottle.
7. Turn the bottle upside down, wait, and watch it fly.
8. Make sure to tidy up the area after you have finished flying your rockets including anything that may have fallen off the rocket. A Scout cares for the environment.

Review

1. Evaluate your hypothesis. Did your rocket behave the way you expected it? Why or why not?
2. What were the best design features of your rocket? What could you improve about it?
3. What could we do to make the rocket fly further or the fuel to be more efficient? What other fuels could you use for your rocket?
4. How do you think changing the size of the bottle might change your rocket?

Safety

- Think about clear and safe areas for launching the rockets. Make sure you are far away from overhead power lines, low trees, etc and make sure to factor in how wind might affect your rocket's flight.
- Keep Scouts and spectators well back from the launch and landing areas.
- Make sure the people who are launching the rockets are wearing eye protection.
- Communicate with everyone who is gathered near the launch area, and make it clear when a rocket is being launched.

Variations

- Make this a patrol competition. Get each patrol to design a rocket that they think will have the best aerodynamics and then measure the flight distances and times to see which patrol made the best rocket.
- Design and add a parachute so that your rocket can return safely to Earth. You can use something fragile like and egg to see if you can get your rocket to land without damaging the egg.
- Consider pre-making some of the more complex construction elements for use with younger sections.
- This challenge card can pair nicely with other bicarbonate of soda and/or vinegar based experiments including, but not limited to, 'Sherbet', 'Make your Own CO_2 Extinguisher', and 'Lemonade' for a larger program.