Title

Bottle Rockets

Workshop Overview

Description: Students will learn about aerospace engineering by building their own rockets.

Topic Area(s): Science, Chemical Engineering, Mechanical Engineering

Grade Level: 3-9 **Duration:** 1 hour

Learning Outcomes:

- Students will learn to use chemistry to construct a solution that will get their rocket to explode
- Construct a rocket – talk about aerodynamics

Hook

Blastoff!

Background Information

Bottle rockets can be made using any procedure that will build up pressure within the bottle. This can be done with any mixture of acids and bases, or some form of pump, which is what we will do. Creating a platform is an important but optional step that allows the rocket to fly instead of spinning on the ground. The reason we add water to the bottle rocket is because water is heavier than air. Newton's third law is force equals mass multiplied by acceleration so the heavier water when pressurized from the air creates more force than pressurized air alone.

Materials

Per student:

- 1 or 2 L bottle

- Cork with hole for pump needle poked through
- Construction paper
- Tape
- Straw
- Dowel or long skewer
- Bicycle Pump with needle

Safety Considerations

Don’t get hit by the rocket. Stay an appropriate distance back from the launch area!

Procedure

- Use construction paper to cover the plastic bottle and make it look like a rocket! Can put fins on it to stabilize it.
- Find a very straight stick or pole to use as a platform. Bury about six inches of the stick in the ground and stabilize it with rocks and sand. Make sure this stick is very straight (and STURDY) and perpendicular to the ground.
- Tape a straw to the soda bottle's side. Use a straw with a circumference large enough to allow it to slide up and down on the stick. Make sure the straw is straight and that the straw's top is level with the bottle's mouth.
- Put some water into the bottle, allow the kids to decide how much water is ideal.
- Put the cork into the mouth of the bottle (it might be necessary to microwave the cork to make it fit).
- Fit the pump into the opening drilled into the cork.
- Fit the rocket onto the pole.
- Pump up the bottle and watch it launch.

Wrap-Up/Debrief

- What designs worked and what didn’t?
- What is the purpose of fins?
- Can you steer the rockets?
- How high did it go?
- What would you have done differently?