Bottle Rocket

Science Film Festival — Knowledge Through Entertainment

Science Film Festival Film

Nanogirl and the Imaginauts

Introduction

Did you know you can make and launch a water bottle rocket using just a plastic bottle, water, cork, needle adaptor and pump? As you pump air through the water the pressure inside the bottle builds up until the force of the air pushing on the water is enough to force the cork out of the end of the bottle. The water rushes out of the bottle in one direction whilst the bottle pushes back in the other. This results in the bottle shooting upwards.

Space rockets work in a similar way to the bottle, but instead of squirting water they burn fuel to make a powerful jet of hot gas. The force of the gas downwards pushes the rocket upwards. This is a great demonstration of Newton's Third Law.

Key Objectives

- To understand the effects of pressure on objects.
- To introduce Newton's Third Law: For every action there is an equal and opposite reaction
- To foster creative design and engineering skills.

Materials

- An empty plastic bottle
- Cardboard made into a cone and 4 fins
- A cork
- A pump with a needle adaptor
- Water

Tasks/Steps

1. Push the needle adaptor of the pump through the cork, it needs to go all the way through so you might have to trim the cork a little bit.
2. Decorate the bottle with the cone and fins.
3. Fill the bottle one quarter full of water and push the cork in tightly.
4. Take the bottle outside and connect the pump to the needle adaptor. If it doesn't stand up on the fins, you can also put it on a box, but if you make some strong fins it should stand up by itself.
5. Pump air into the bottle, making sure all spectators stand back, the bottle will lift off with force after a few seconds.

Authors/Source

https://www.science-sparks.com/making-a-bottle-rocket/

Intermediate

Resource Type
Project

Topics
Aerodynamics | Pressure

Subjects
Physical Science | Physics | Science and Technology

Keywords
Flight | Force | Laws of Motion | Mass | Pressure | Bottle Rocket

Time For Activity
45 minutes

Guiding Questions

1. What makes one rocket perform better than another?
2. What is creating the thrust in our rockets?
3. What is Newton's Third Law?

Safety vInstructions

Please make sure an adult is around as the rocket takes off very suddenly and forcefully. Do not approach the rocket once you have started pumping even if it looks like nothing is happening.