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AIM KITS

Bottle Rockets

October 2025

October 2025: Bottle Rockets

This months AIM Kit is constructing bottle rockets. Bottle rockets are a fun way to explore the science behind rocketry and motion. Each launch demonstrates how forces work together and how engineers use problem-solving to make rockets stable, efficient, and powerful.

Rockets have a history that stretches back hundreds of years in battle and firework shows. In the 20th century, rockets began to change from weapons and fireworks into powerful tools for exploration. Some of humanity's greatest achievements have come from rockets: the first satellite, Apollo missions, etc. Today, rockets are still at the heart of space exploration, carrying astronauts, telescopes, and rovers to explore the universe.

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MATERIALS NEEDED:

1. Empty 2-liter plastic soda bottle
2. Water
3. Cork or rubber stopper
4. Bike pump w/ needle adapter
5. Cardboard
6. Tape
7. Scissors
8. Safety goggles

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PROCEDURE:

1. Wash out soda bottle and remove label. The bottle opening will be the rocket nozzle and should point downwards
2. Cut 3 fins out of cardboard and tape them evenly around the bottom (opposite the opening)
3. Measure 500 mL of water and pour it into the botte
4. Firmly push the rubber stopper or cork into the bottle opening to seal it
5. Take the bottle outside and place the bottle cap down at a slight angle away from you
6. Use your pump to slowly pump air slowly into the bottle until the pressure forces the stopper out. Do not lean over the rocket
7. Watch your rocket fly!

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WHY IT WORKS:

Bottle rockets work because of Newton's Third Law of Motion: for every action, there is an equal and opposite reaction. When air pressure builds up inside the bottle and pushes water out of the nozzle, the escaping water creates a powerful downward force. In response, the rocket is pushed upward into the air. The amount of water, the air pressure, and the rocket's shape all affect the launch. More water affects the mass, but too much makes it heavy. Air pressure provides the stored energy and the fins keep the rocket stable. Together, these simple principles make a plastic bottle fly like a real rocket.

Contact Us

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About STEMducate

STEMducate is a non-profit organization dedicated to creating and promoting STEM to students from a young age to increase their curiosity and imagination. Our goal is to expose students to STEM opportunities and careers, enabling them to dream big and make their dreams a reality. We provide positive and powerful opportunities and experiences in STEM fields for people of all ages. These initiatives will hopefully entice students toward becoming the next innovators, educators, researchers, and leaders. We aim to reduce the number of unfilled jobs due to the lack of specialized skills that are needed to perform job tasks.

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