

WATER BOTTLE ROCKET

Learn about Newton's Laws of Motion through rocket flight, more specifically Newton's Third Law that states for every action, there is an equal and opposite reaction. The water bottle rocket uses water (fuel) and compressed air (energy) to generate thrust. After the rocket is pressurized, releasing the stopper causes the air to force water downward and out of the bottle (action) and propel the rocket upward (reaction).

MATERIALS

- 2-liter bottle
- Cardboard
- Construction paper
- Water
- Air/bike pump
- Packing tape
- Scissors
- Launching base
- *Note: You can build one with PVC or wood or buy one for about \$40 here: <https://www.arborsci.com/bottle-rocket-launcher.html>*

METHOD

1. Cut 4 triangle fins out of cardboard (4- by 3- by 5-inch cutout).
2. Empty a 2-liter bottle, removing all liquid and the label.
3. Flip bottle upside down and tape the 4 fins at a right angle toward the base of the bottle.
4. Form construction paper into a cone and tape to the top of the bottle.
5. Fill bottle with approximately 20 oz. of water and secure it to the launcher.
6. Secure bike pump to the launcher.
7. Pressurize launcher with a maximum of 30 pounds of air from bike pump.
8. Launch!

TAKE IT BACK TO CLASS

- What happens if you only fill the rocket with air (no water)?
- How does varying the pressure affect rocket flight?
- What improvements can you make to your rocket to help it fly farther, straighter or faster?

SOURCE

https://www.teachengineering.org/activities/view/ucd_bottlerockets_activity1

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