



## **Push It Out**

**Primary Audience: 3<sup>rd</sup> – 5<sup>th</sup>**

**Description:** Build and launch a rocket.

**Key Words:** Rocket, Newton's Laws of Motion

### **Materials:**

- Two-liter drink bottle
- Rubber stopper or wooden cork that will fit into the neck of your bottle (you can buy these at most hardware stores)
- Hand- or foot-powered air pump
- Inflation needle
- Thin nail or other thin, sharp object
- Cardboard
- Tape
- Scissors

### **Instructions:**

1. Make sure your stopper or cork fits snugly into the neck of your bottle.
2. When you have a cork or stopper that fits, poke a hole through the center with the nail (be careful!).
3. Press the inflation needle through the cork or stopper until the base rests snugly against the body of the cork or stopper.
4. Build fins for your rocket out of cardboard. These fins will serve as your launch tower, so make sure they're long enough to lift the neck/stopper/inflation needle assembly off the ground.
5. Tape your rocket fins firmly into place.
6. Carefully fill your bottle about one-quarter to one-third full with water.
7. Insert the cork or stopper and attach the air pump.
8. Take the whole thing outside; do not attempt to launch indoors!!
9. Set the rocket on its fins with the air pump a safe distance away. Make sure no objects (including your own or another person's head) are directly above the rocket!
10. Begin pumping. You'll see air bubbles entering the bottle.
11. Pump until the rocket blasts off. Collect your rocket, repair any damage to the fins, and try again!

Topic: Flight

### **What's Going On?**

A rocket works because of Newton's Third Law: for every action, there is an equal and opposite reaction. The action is the air and water rushing out the bottom of the rocket. The reaction is the rocket flying high into the air. Experiment with different amounts of water to find out how the rocket reacts. What happens with too much water? What happens with not enough water, or no water at all?

### **Relevant Ohio Science Content Standards:**

**Physical Sciences:** 1.5,1.6,3.3,3.4,8.3, 9.24