

Rocket Launchers

Alignment with NGSS

K. Forces and Interactions: Pushes and Pulls

K-2. Engineering Design

Activity: Air is *something*!

This activity will demonstrate the air is something. Air is comprised of molecules that, when acted upon, have the power to move things.

Materials

- Plastic 2-liter bottle with cap, or 20-oz. plastic bottle with cap
- Flexible plastic hose (approximately 2.5 feet) with a diameter that will fit snugly around the bottle cap (found at hardware stores)
- Hard plastic tubing (appx. 2.5 feet) with a diameter of appx. 1.5 inches (found in hardware stores)
- Toilet paper roll
- Duct tape
- Art materials for decorating

Procedure: Building the Launcher

1. Adult role: Saw the top off the plastic bottle cap, fir the cap inside one end of the flexible hose. Use duct tape to secure the cap into the end of the hose.
2. Screw the bottle into the cap. You should have an airtight seal.
NOTE: If you do not want to saw the bottle cap, skip this step, remove the bottle cap, and duct tape of the flexible hose directly to the top of the bottle—it should be an airtight seal.
3. Fit the other end of the flexible plastic hose into one end of the hard plastic tube. Use duct tape to create an airtight seal.

Procedure: Building the Rocket

1. Seal one end of a toilet paper tube using paper and tape to create an airtight cap.
 2. Be sure to keep the other end of the tube open and unobstructed.
 3. Decorate your rocket any way you like, using markers, colored tape, paper, etc.
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Rocket Launchers cont.

Procedure: Launching the Rocket

1. Place the open end of your rocket over the top of the hard plastic tube and let it sit on the tube.
2. Direct the tube straight up, or in the direction that you'd like to stomp your rocket.
3. Stomp on the bottle!
4. Your rocket will launch off the tube!
NOTE: The harder you stomp (or more energy and force that you apply), the faster/further the rocket will launch. A lighter stomp (less energy and force) will send the rocket less distance.
5. To repeat, blow into the tube to re-inflate the bottle. The bottle can be stomped and re-inflated over and over again, until the plastic bottle cracks. At that point, simply replace the bottle with a new one, and recycle the crushed bottle.

Discussion/Follow-Up:

1. **What made your rocket launch?** When you stomped on the bottle, you forced all of the air molecules to compress (or squeeze together) quickly and move up into the tube. As the air molecules shot through the tube and out, they forced your rocket to move.
2. **Extension Activity:** Set up a target, such as a standing hula hoop and try to direct your launch into the target. *Can you control the direction and speed of the launch to reach your target?*
3. **Related Activity for Early Learners:** Squeeze a clean, empty ketchup bottle or mustard bottle and feel the air that shoots out through the spout.
*What are we feeling? It's air! We can't see the air, but we can feel it. Air is **something!***



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