Blast Off!

Activity 1

In this activity, kids launch a straw rocket using only air power.

Prepare Ahead

- Try building a rocket launcher yourself, so you can anticipate where kids may get stuck or need guidance.
- Collect 20 oz. plastic bottles. (Other sizes will work, too.)
- Make sure you have straws of two different widths. One should fit smoothly over the other.
- On the day of the activity, set up workspaces with plastic bottles, wide and thin straws, and a container of clay. For kids' convenience, you may want to separate the clay into balls about the size of a quarter (one per kid).

Safety Tip

Tell kids to point their rockets away from people before launching.

Lead the Activity

1. **Introduce Ruff's challenge.** (3 minutes) Tell kids that today's challenge is to make a rocket that is launched using air power. Ask for examples of objects that are powered by air (*windmills, sailboats, wind turbines, kites, paper airplanes, gliders*).

2. **Look at the bottle and make predictions.** (5 minutes) Hold up an empty bottle and squeeze it. Ask what is inside the bottle. (*Air*) Put your hand over the top of the bottle and try to squeeze it. Ask what happens to the air. (*It's trapped inside the bottle.*) Ask kids to make a prediction about what they think will happen if there is only a small hole for the air to escape through.

3. **Build rockets.** (10 minutes) Hand out the activity sheets. Have kids make their rockets, following the directions. It's important that the rocket launcher is airtight. If kids are having a problem getting their rockets to launch, check the following:
   - Are there any holes or gaps in the seal between the clay and the bottle, or the clay and the straw?
   - Is the wide straw caught in the clay covering the bottle?

Materials

- activity sheet for each kid
- empty 20 oz. plastic bottles (1 per kid)
- 1 package of thin straws
- 1 package of wide straws (able to fit over the thin straws)
- 1 package or small tub of modeling clay (or poster putty) per group
- clear tape
- scissors
- a selection of the following: construction paper, string, or paper streamers

National Science Education Standards

Grades K–4

Science as Inquiry: abilities necessary to do scientific inquiry; understanding about scientific inquiry

Physical Science: properties of objects and materials; position and motion of objects

Science and Technology: abilities of technological design

Grades 5–8

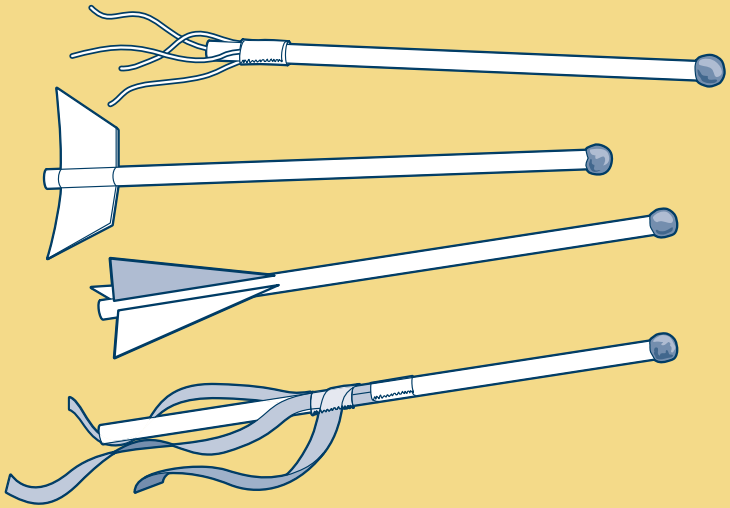
Science as Inquiry: abilities necessary to do scientific inquiry

Physical Science: properties and changes of properties in matter; motions and forces

Science and Technology: abilities of technological design

4 Test the rockets. (10 minutes) Have kids experiment to see how far and high they can get their rockets to go. You may want to make a starting line from where kids can launch their rockets. Use masking tape or a sticky note to mark the distance of each rocket's flight. To test height, kids can try to shoot the rocket over a length of string stretched across a doorway or other open area.

5 Create new designs. (7 minutes) Have kids use the optional materials to add wings and tails to their rockets. Encourage them to notice changes in how the rocket flies based on the material they add.



6 Discuss what happened. (5 minutes) Bring the group back together. Allow the kids to show off their rockets. Ask:

- Did you expect your rocket to fly as far as it did?
- Did you hold your rocket the same way each time you launched it? How did you hold it if you were testing for distance? Testing for height?
- Did anyone have a problem with his or her rocket design? How did you solve it?

7 Award points. (5 minutes) Time to rack up some points! Review the activity's key ideas by asking the following questions, worth 50 points each.

1. What powered your rocket? (*Air*)
2. Can someone explain how the rocket launcher launched the rockets? (*Squeezing the bottle pushes air up through the thin straw, which then launches the wider straw.*)
3. What could you do to make your rocket go farther? (*Squeeze the bottle harder. Change the angle of the bottle.*)
4. What happened if you made your rocket too heavy (by putting too much clay on the end, or by adding too many modifications)? (*The rocket doesn't fly as far.*)
5. Can you name some other things that are powered by air? (*Answers will vary.*)