



**E**ven though you cannot see air, you know it is there. Air is a mixture of gases that we breathe every day even when we are sleeping. Have you ever had a toy that used air to make it work? Maybe you had a kite that caught the air and flew high in the sky. Perhaps you had a boomerang or flying disc that zoomed through the air. Some toys have special air pumps to create air pressure inside of them. In this activity, you will use air pressure to make Avogadro's Air Rockets go.

## Materials

- \* Pencil
- \* Paper
- \* Blunt-ended scissors
- \* Tape (clear cellophane)
- \* Thin plastic coffee stirrer
- \* Straw
- \* Empty dish detergent squeeze bottle (remove cap, rinse out and shake dry)
- \* Colored pencil, crayon or water-based marker (optional)

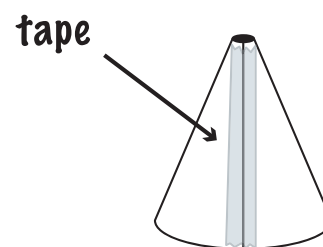
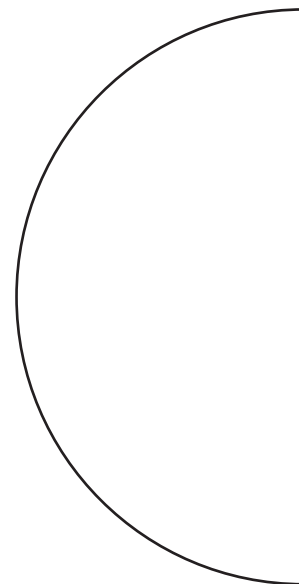
**ADAPTATION** Leave the top on the bottle, make a closed cone without the straw or coffee stirrer and blast the air rocket from the top of the bottle.

**SAFETY!** Be sure to follow Milli's Safety Tips and do this activity with an adult!



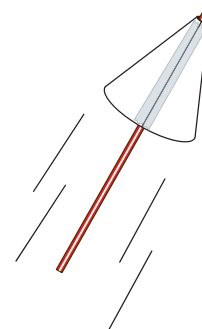
## Procedure

1. Use a pencil to draw a half circle on a piece of paper or trace the half circle shown here.
2. Cut out the half circle with the scissors. You may decorate your half circle with colored pencil, crayon or water-based marker.
3. Leave a small opening at the tip and tape it to make a cone.
4. Stick one end of the stirrer through the tip and tape it in place to the inside of the cone.
5. Place the straw into the empty bottle and hold it in place with your hand. Try to cover the opening around the straw as much as possible with your hand.
6. Place your air rocket onto the straw.
7. Point your air rocket away from yourself and from others. Give the bottle a hard squeeze and watch your air rocket go.
8. What happened to your air rocket? Write your answer in the "What Did You Observe?" section.
9. Launch your rocket several more times. Try to hold the bottle the same way and squeeze with the same amount of pressure each time.
10. Thoroughly clean the work area and wash your hands.



### Where's the Chemistry?

When you held the straw in place at the neck of the bottle and covered the rest of the opening, the straw was the only way for any air in the bottle to get out. When you squeezed the bottle, more pressure was put on the air inside. This shows that air was in the bottle even though you could not see it. You launched your air rocket by quickly changing the pressure on the air inside the bottle, forcing it out through the straw.



### Try this...

Try making some air rockets with bigger and smaller half circles or different materials like aluminum foil, tissue paper, card stock or newspaper. Which ones go further? How might the materials make a difference? Consider the weight and the durability of the materials. What would make some better to use than others? Try using a plastic drink bottle instead of a dish detergent bottle.



### What Did You Observe?

What happened when you gave the bottle a hard squeeze?

Were you able to get similar results by holding the bottle and squeezing it the same way each time?

Describe how high the rocket went into the air.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at [www.acs.org/kids](http://www.acs.org/kids).

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## Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

### Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

**Never** eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

**Never** experiment on your own!

**For more detailed information on safety go to [www.acs.org/education](http://www.acs.org/education) and click on "Safety Guidelines".**

