

## Activity 2

# Breathing Room

### PUT YOUR LUNGS TO THE TEST IN THIS BREATHTAKING ACTIVITY.

How often do you pay attention to your breathing? For some people, breathing isn't always easy. Out of every 10 kids, 1 to 2 suffer from asthma. During an asthma flare-up, airways swell and narrow, trapping air. Kids may feel as if they are trying to breathe through a straw. Doctors use lung function tests to monitor people with asthma and find out how much air they can inhale and exhale.

Check for latex allergies before purchasing balloons. Kids with respiratory problems should not breathe through the straws or blow up the balloons, but they can help record measurements and collect data.

#### Here's how:

- 1. Experiment with breath.** Pass out the straws. Have girls stand up and breathe in and out. Now, have them repeat this while breathing through the straw. Ask girls how it made them feel. <sup>2</sup> Could they function all day while only breathing through the straw? (Some people describe asthma as "breathing through a straw.")
- 2. Question.** Divide the group into pairs. <sup>1</sup> Pass out the remaining materials and ask girls to think about how they could measure their lung capacity. <sup>6</sup> Then, give the **SciGirls Challenge**: How does the amount of air in

### You'll Need:

#### per small group

- ◆ string
- ◆ scissors
- ◆ ruler
- ◆ tape (any kind)
- ◆ paper and pencil
- ◆ optional: permanent marker

#### per girl

- ◆ balloon
- ◆ drinking straw



a balloon change as you vary the size of the hole you blow through?

- 3. Prepare your balloon.** Have each girl stretch her balloon and blow it up a few times to relax the material.
- 4. Test vital capacity.** Have girls stand up and inhale as much air as possible. Then, exhale forcefully into the balloon in one breath. (This measures the maximum amount of air that can be pushed out of the lungs, which is called the vital capacity.)

Visit [pbskidsgo.org/scigirls](http://pbskidsgo.org/scigirls) for videos and projects.



# Breathing Room continued



**5. Measure.** To measure how much air this is, girls can pinch the balloon shut (not tying it!) and measure its circumference at the widest part using string and a ruler. Have girls do this three times and then find the average circumference. (See right.)

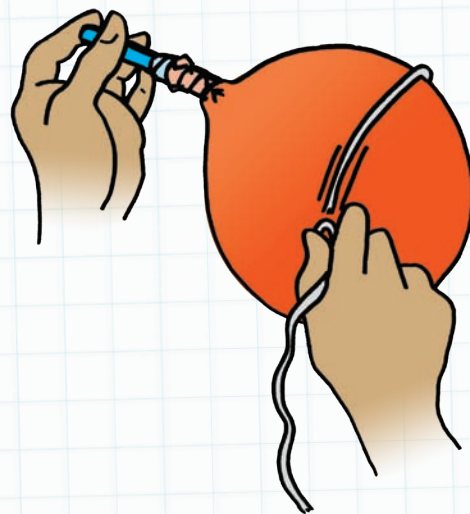
**POINTER:** Have girls use a permanent marker to draw a line where they measure the circumference. This way, they can measure at the same place over multiple trials.

**6. Predict.** Now, have the girls cut a 4-in. piece of straw and insert it into the balloon opening. They should tape the balloon around the straw so no air can escape. Ask girls to make a prediction about whether the circumference of the balloon will increase, decrease, or stay the same when they try to blow it up now. <sup>6</sup>

**7. Try it!** Tell the girls to inhale as much air as possible and exhale through the straw. Measure the circumference. Repeat two more

times, and find the average. How does this average circumference compare to the first one, without the straw?

**8. Continue exploring.** Suggest that girls design an experiment to find out what other factors affect vital capacity besides asthma. For example, they might consider height, age, various postures (standing, sitting, lying down), gender, and fitness level. Be creative! <sup>3 4</sup>



Watch Madeleine shadow Dr. Beck at work on the *SciGirls Live Healthy* DVD. (Select Horsing Around: Mentor Moment.) <sup>7</sup>



**Mentor Moment** Dr. Jodene Beck is a veterinarian who loves horses, but it was actually her childhood dog combined with her love of science and medicine that drove her to the field. She inspires young girls by letting them shadow her at the clinic.