Breathe In, Breathe Out!

OVERVIEW

In this lesson, students watch a short video to learn the basic components of the respiratory system. Then they use what they've learned to complete a puzzle. Next, students participate in a guided breathing exercise that allows them to feel their respiratory system in action and gives them a tool to reduce anxiety and promote relaxation. Finally, students discuss how important it is for us all to protect the quality of the air we breathe because we—and many other living creatures—rely on having clean, fresh air to survive.

KEY OBJECTIVES FOR STUDENTS:

✔ Recognize that many living organisms need clean air for survival.

✔ Describe key components of the human respiratory system and how they function.

✔ Perform a breathing exercise to increase awareness of their breathing and to learn a relaxation technique.

✔ Explain why it is important to protect air quality.

⊙ ESTIMATED TIME NEEDED (MINUTES):
⊙ 50 minutes

GRADE LEVELS:
1, 2

PRIMARY SUBJECTS:
Environmental Education, Physical Education, Science

SECONDARY SUBJECTS:
Art, Health and Nutrition, Mathematics, Music, Reading or Language Arts

TOPICS:
Air, Breathing, Breath, Breathe, oxygen, lung, respiratory system, Airways, throat, trachea (windpipe), Bronchial tubes, alveolus, Diaphragm, inhale, Exhale, Air quality, Air pollution, Climate

METHODS:
Brain-Based Learning, Multi-Disciplinary, Multiple Intelligences, Real-World Application, Technology Integration

SKILLS:
Collaboration, Communication skills, Critical Thinking, Systems thinking

VALUES:
Curiosity, Mindfulness, Optimism
BACKGROUND INFORMATION FOR TEACHERS:

With this lesson, students explore the respiratory system in order to understand that we are completely dependent upon air for our very survival, as are many other living organisms. As students learn how they use their respiratory system to inhale and exhale air and how they can influence their own health and mood by regulating their breathing, they develop an awareness of their body and a connection to the air around them and learn to appreciate the value of fresh air. Because the lesson fosters self-awareness, self-care, and appreciation for natural resources, it provides a valuable tool for navigating difficult situations and is a vital component of sustainable intelligence.

PREVIOUS SKILLS NEEDED:
Fine motor skills (coloring, cutting, pasting), listening skills

IN ADVANCE:
Set up and test the audiovisual equipment so that you are ready to show the Respiration Moves Me video in class. Locate relaxing music you would like to share with the class and ensure you have the equipment to play the audio. (See the External Resources section on the Extend tab for some suggestions of music.)

Make a copy of the My Respiratory System Puzzle and the Breathe In, Breathe Out! Self-Check for each student. Verify that you have all materials needed for the puzzle activity. Set up workstations in the classroom with materials at each station so students can share materials.

MATERIALS NEEDED:
- Audiovisual equipment to show video
- Audio equipment to play relaxing sounds melody
- Colored pencils, crayons, or markers (variety of colors for each group)
- Safety scissors (2–3 pairs per group)
- Glue stick (2–3 per group)

KEY VOCABULARY:
- air
- breathing
- breath
- breathe
- oxygen
- lung
- respiratory system
- airways
- throat
- windpipe
- bronchial tubes
- diaphragm
- inhale
- exhale
- air quality
- air pollution

SAFETY INFORMATION:

If students get confused about what they are supposed to do during the breathing exercise, they may hold their breath too long or (in rare situations) hyperventilate. Keep an eye on them, and if any students seem to be confused about or struggling with the breathing exercise, have them slowly breathe in and then slowly breathe out without holding their breath or counting. If you are aware that any students have asthma or other respiratory issues (including a cold), you may wish to have these students start with this slow-breathing exercise and avoid having them hold their breath. Alternatively, these students could simply observe the class. Also, make sure there is sufficient space between students and that they are breathing quietly, not forcefully, so they do not spread germs or detract from the relaxing aspect of the lesson.
ACTIVITY OUTLINE:

<table>
<thead>
<tr>
<th>Time</th>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min.</td>
<td>Introduction</td>
<td>Introduce the topic with a riddle and a pre-assessment.</td>
</tr>
<tr>
<td>5 min.</td>
<td>Video</td>
<td>Show students the Respiration Moves Me video.</td>
</tr>
<tr>
<td>15 min.</td>
<td>My Respiratory System Puzzle</td>
<td>Students complete the puzzle to demonstrate what they've learned about their respiratory system.</td>
</tr>
<tr>
<td>10 min.</td>
<td>Let's Breathe!</td>
<td>Guide students in a breathing exercise that fosters awareness, control, and relaxation.</td>
</tr>
<tr>
<td>5 min.</td>
<td>Clean Air</td>
<td>Discuss the value of clean air.</td>
</tr>
<tr>
<td>10 min.</td>
<td>Wrap-Up</td>
<td>Conclude with a synthesizing discussion.</td>
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IMPLEMENTATION:

1. **Introduction:** Challenge students to resolve the following riddle: I'm light as a feather, yet the strongest man cannot hold me for much more than a minute. What am I? *(a breath)*

2. Check students' prior knowledge of the topic with a discussion, using questions such as the following: Do you know why breathing is important to us? *(We breathe in oxygen, which our bodies need to survive.)* What is oxygen? *(It is a gas in the air, and many living things must breathe it in to survive.)* Do you know how air enters your body? *(through my nose and mouth)* Do you know which part of your body is responsible for your breathing? *(my lungs)* What does air do for our bodies? *(Our body’s cells take in oxygen and use it to give us energy and help with the proper functioning of other body systems.)* If students don't know the answers to these questions yet, reassure them it's ok. In this lesson they are going to learn all about how we breathe air and how our lungs help us do that!

3. **Video:** Tell students that now you'd like to share with them the video Respiration Moves Me.

4. **My Respiratory System Puzzle:** After the video, tell students: Now that you've learned so much about the respiratory system and how our lungs breathe air in and out, I'm going to challenge you to complete a puzzle!

5. Divide the class into groups of 4–5 students, and direct students to the workstations you've set up with the necessary materials.

6. Give each student a copy of the My Respiratory System Puzzle to complete. As students color, cut out, and glue the puzzles, walk around and give them hints from the answers version as necessary to guide their work.

7. **Let's Breathe!** When students have completed the puzzle, tell them: Even though we can't see our lungs, we can feel how they work. Ask them to stand up, put their hands on their chest, and take a deep breath. *(Model this action for students.)* Tell students to pay attention to how the air feels when it passes through their nostrils. Ask: Does the air feel warm or cool? Ask them to breathe out and then take another big breath; this time, have them pay attention to how their chest gets slightly bigger with the breath. As students breathe out the air, encourage them to notice how their chest gets slightly smaller again. Ask students if they know why their chest expands when they breathe. *(My chest expands because my lungs are filling with air.)*

8. Move the classroom furniture to open up a large space, and direct students to sit crossed-legged in a big circle on the floor. Have them spread out from each other to the extent that space allows.
9. Explain that you are going to teach them a breathing technique called "Belly Breathing," which will help them feel relaxed and calm. Turn on some relaxing music to help set the mood.

10. Modeling the technique as you go, tell students to sit up very straight. Explain that it is important for us to have good posture so that we can breathe properly. If we don't, air can't completely fill our lungs. Then explain that you would like them to breathe air in through their nose and out through their mouth. (Demonstrate for students.)

11. Next, guide students in a slow-breathing exercise:
   a. Direct students to inhale for four seconds. Tell them to use their diaphragm to pull air into their belly first and then into their lungs. Model putting your hands on your belly to feel how the belly contracts and expands.
   b. Direct students to hold their breath for two seconds.
   c. Ask students to slowly exhale through the mouth for five seconds. They should push the air out of their lungs first and then out of their belly.
   d. Have students pause here and wait for two seconds before inhaling again.
   e. Repeat steps a–d four times.

12. After students have practiced this technique for four cycles, use questions such as the following to encourage reflection:
   How do you feel now? Do you feel calm and relaxed? Do you feel any different now than you did before this breathing exercise? Did you find breathing this way to be easy or difficult? Explain that the technique gets easier with practice and that it can be done sitting, standing, or lying down—basically anywhere and anytime.

13. Ask students if they can recall a time that their breathing felt very different—maybe they noticed themselves breathing very rapidly or shallowly. (Sample answer: Yes! When I run I breathe very fast. When I am nervous, my breathing changes, too. I don't think I breathe very deeply when I'm nervous.) Explain to students that they can use this technique anytime they want to slow down their breathing or breathe more deeply, such as when they are nervous or upset. You might want to run through the exercise one more time with students. This time, you could suggest they lie on their backs and close their eyes while you guide them.

14. Encourage students to practice and experiment with this technique frequently to see how it can help them feel calmer and more relaxed.

15. **Clean Air**: Ask students: Have you ever walked outside and found the air so thick or dirty that it was hard to breathe? Encourage students to share their experiences. Explain that, as they saw in the video, many human and natural activities can lead to air pollution. Ask students if they can name any of these activities. (forest fires, pollution from factories, pollution from cars, dust storms, tornadoes, etc.) Explain that it's important for humans and many, many other living things to be able to breathe, so it's important that we protect what we call air quality. Does anyone know what air quality is? (It refers to the degree to which the air around us is free of pollution.) Explain: We can get a sense of air quality by using our senses to observe it. Is the air smelly? Does it look dusty, smoky, or full of pollen? Is it hard to breathe in this air?

16. **Wrap-Up**: Ask students: Did you know that plants help clean our air? When they "breathe," they release fresh oxygen into the air, so the more plants we have around us, the more likely it is that we'll have clean air to breathe. So it's good to have a lot of plants around, right? Ask students if they have any other ideas about how we can help protect the air so it stays clean and fresh. (Accept all reasonable answers at this point—the question is explored in greater detail in the next two lessons. Sample answers: We can ride in cars less or encourage our parents to get cars that don't pollute the air very much. We can make sure we don't start fires. We can make sure we don't spray smelly things into the air.)

17. To conclude, give each student a copy of the Breathe In, Breathe Out! Self-Check. Ask them to respond to each question by drawing a check mark in either the "Yes!" column or the "Not Quite" column.
REFLECT

REFLECTION QUESTIONS:
Use the following questions to guide students to reflect about the lesson.

- **How does breathing in air help our bodies?** *(Sample answer: It brings oxygen into the body. Our cells need oxygen to give us energy, build new cells, and take care of other things the body does.)*
- **Briefly describe how we breathe in.** *(Sample answer: We inhale oxygen from the air through our nose or mouth; it passes through our throat and windpipe until it reaches our lungs, where it is absorbed into the blood.)*
- **Why is it important that we breathe out?** *(Sample answer: We must exhale to get waste gases out of the body.)*
- **Imagine you are running outdoors with your friends. What do you think your breathing will be like when you stop running?** *(I will be breathing very fast.)*
- **How can you use your breathing to help you relax or calm down?** *(I can take deep, slow breaths.)*
- **Why is it important that we—and many other living things—have clean air to breathe?** *(We breathe air into our bodies and use it to keep us alive and healthy. If the air is polluted, it will not be as healthy for us.)*
- **How can we take care of the air we breathe?** *(Sample answer: We can plant trees, walk or ride a bike instead of riding in a car, and be careful not to put pollutants in the air.)*

ASSESSMENT OPPORTUNITIES:
This lesson offers multiple assessment opportunities. You can gauge prior knowledge and misconceptions with the initial discussion and then ask the same questions at the end of the lesson to gauge students’ progress. In addition, you can evaluate the students’ completed My Respiratory System Puzzle to see how well they understand the topic. Also give students an opportunity to self-assess their understanding with the Breathe In, Breathe Out! Self-Check. (Their responses to the self-check and their completed puzzles make great additions to a student portfolio, if you use those in the classroom.) The Reflection Questions on the Assess tab are another great opportunity to check students’ comprehension. The ideas shared on the Extend tab provide further opportunities for checking students’ progress and understanding.

STANDARDS ASSESSMENT:
This lesson, with all components included, is linked to the following standards:

**Common Core State Standards (CCSS):**
- **1st Grade:** RL.1.10, RF.1.1a, RF.1.2a–b, RF.1.3a–g, RF.1.4a, W.1.2, W.1.8, SL.1.1a–c, SL.1.2–6, L.1.1a–j, L.1.2a–e, L.1.4a, L.1.5a–d, L.1.6
- **2nd Grade:** RL.2.10, RF.2.3a–f, RF.2.4a, W.2.2, W.2.8, SL.2.1a–c, SL.2.2–6, L.2.1a–f, L.2.2a–e, L.2.3a, L.2.4a, L.2.5a–b, L.1.6

**Cloud Education for Sustainability (EfS) Standards & Performance Indicators:**
- **Pre-K–2:** A1, B10, C1, C4, C18, C28, C29, D7, E4, F1, G6, G7, H11

**Texas Essential Knowledge & Skills (TEKS):**
- **Science:**
  - **1st Grade:** §112.12.b.1.A–C, §112.12.b.2.A, D, E, §112.12.b.3.B
  - **2nd Grade:** §112.13.b.1.A–C, §112.13.b.2.A, D, E, §112.13.b.3.A

- **Health Education:**
  - **1st Grade:** §115.3.b.1.A, §115.3.b.A, B, §115.3.b.8.B
  - **2nd Grade:** §115.4.b.3.B

- **Estándares Secretaría de Educación Pública (México):**
  - **Español:** LIT.PB.1.1, 1.3, 1.5, 1.6, 1.8, 1.9, 1.11, 1.12, PTE.PB.2.1–2.10, PCO.PB.3.1–3.5, FUL.PB.4.2–4.5, 4.7, AL.PB.5.2–5.5, 5.7, 5.8
  - **Ciencias:** CC.PB.1.6, ACT.PB.2.3, HC.PA.3.2, 3.5, AC.PB.4.1–4.4, 4.6, 4.7
COMMUNITY CONNECTIONS:
Yoga is an excellent tool for increasing awareness of and deepening our breathing. It also helps us tune into the natural world that surrounds us. Encourage students to invite the members of their household (and the larger community, if you wish) to participate in a Yoga Practice Day. Recruit a yoga trainer to volunteer to guide the group through a practice session in a nearby park or other public space. After the practice, ask students to share with participants what they learned in class about breathing for relaxation, as well as their experiences and thoughts about air quality. Encourage a community discussion about the importance of clean air and what we can all do to help keep it clean.

DIFFERENTIATION:
To help students better understand and remember what they've learned about the respiratory system, have them play a low-stress discussion game. Ask them to form two lines (or two concentric circles), with the paired students close to each other but with as much space between the pairs as possible. Tell students in one line (or circle) that they are the #1 students and the students facing them are the #2 students. The #1 students will have two minutes to explain what they know about the respiration system to their partners. Then the #2 students will have two minutes to share what they know. Say "Go!" and time them for two minutes as the #1 students explain the respiratory system. Then time them for two more minutes as the #2 students explain. Have the #2 students move one stop to the right so that everyone has a new partner. Repeat this process at least five times. The ask students to nominate the person they think did the best job explaining, and have that person or persons share his or her explanation with the class.

CROSS DISCIPLINARY CONNECTIONS:

Language Arts
Write each vocabulary word from the lesson on an index card. On the back of each card, write an instruction for students to carry out on a separate sheet of paper (preferably recycled!). For example, on the back of the card for lung, you could direct students to draw the lungs; on the back of the trachea card, you could ask students to neatly write the word trachea seven times; on the back of the mouth card, ask students to describe what it feels like (or what they think it might feel like) to whistle; and so on. Put the cards in a "knowledge baggy" and pass the bag around the classroom. Instruct students to pull a card out of the bag and execute the instruction for the class or for a partner. When they are finished, they can return the card to the bag.

Mathematics
Ask students to brainstorm a list of all the transportation vehicles they can think of, listing them on a sheet of paper at their desk. (Sample answers: car, bike, skateboard, boat, airplane, motorcycle, etc.) Then collect all the sheets, and on the board tally the answers students listed. For example: car/automobile: 20; bicycle: 10; motorcycle: 3, etc. Then ask: Which of these vehicles needs gasoline/fossil fuel in order to run? Put a check mark next to those vehicles. Explain that the vehicles with a check mark all contribute to air pollution. Then have students create a bar chart to show the number of different types of vehicles they listed. Ask: Do you think humans use polluting vehicles or nonpolluting vehicles more frequently? (Most students will say we use polluting vehicles more frequently.) Ask: What could we as a class do to use nonpolluting vehicles more often? (Sample answers: We could find a buddy to ride bikes to school with. My mom or dad could walk with me to school instead of driving me in a car.)

Art
Encourage students to create a classroom or hallway bulletin board that shows how valuable clean air is to living things. Suggest they add pictures of humans and different types of animals. They may also wish to show people riding bikes, walking, and planting trees. Suggest they come up with a friendly title for the work, such as “We Love Clean Air!”

CULTURAL ADAPTATION NOTES:
Some places are more prone to air pollution than other places. If your students live in a crowded metropolitan area, they are probably very familiar with what air pollution looks and smells like. If students live in a small, more rural town, they may not be as familiar with air pollution. You could help students understand more about air pollution by showing them pictures of a smoggy city, smoke and ash erupting from a volcano, plumes of smoke emanating from a forest fire, dust storms, etc. Then ask students: Does air stay in one place or move? (It moves!) Because it moves, the actions of people in a big city can impact people and other organisms in a small town and vice versa. It's important that we all do our part to protect the quality of the air we breathe.

TECHNOLOGY:
Give students an opportunity to explore an online simulation of the breathing process, such as this one from Intel Education Resources, which has students manipulate the parts of the respiratory system to reanimate a patient: Breathing and Respiration.