



Indoor air often contains higher concentrations of pollutants than the air outside. Photo courtesy of the CDC/Dawn Arlotta.

Healthy Homes

The Science of Air: Activity 11

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Healthy Homes (activity and post-assessment)

This activity's objectives are aligned with the National Science Education Standards, specifically those related to Science as Inquiry and Physical Science. Healthy Homes uses guided inquiry to provide instruction about potential indoor air hazards at home.

In this activity, students will identify potential airborne pollutants in their homes and learn ways to reduce or eliminate these hazards. They will make and record observations, draw conclusions based on their investigation, and apply prior knowledge to a new situation.

The primary science concept addressed in this activity is that we are able to influence many aspects of indoor air quality. Students will discover that it is fairly easy to improve the quality of air in their homes.

Reference

Moreno N., B. Tharp, and J. Dresden. (2011). *The Science of Air Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-74-3. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Image Reference

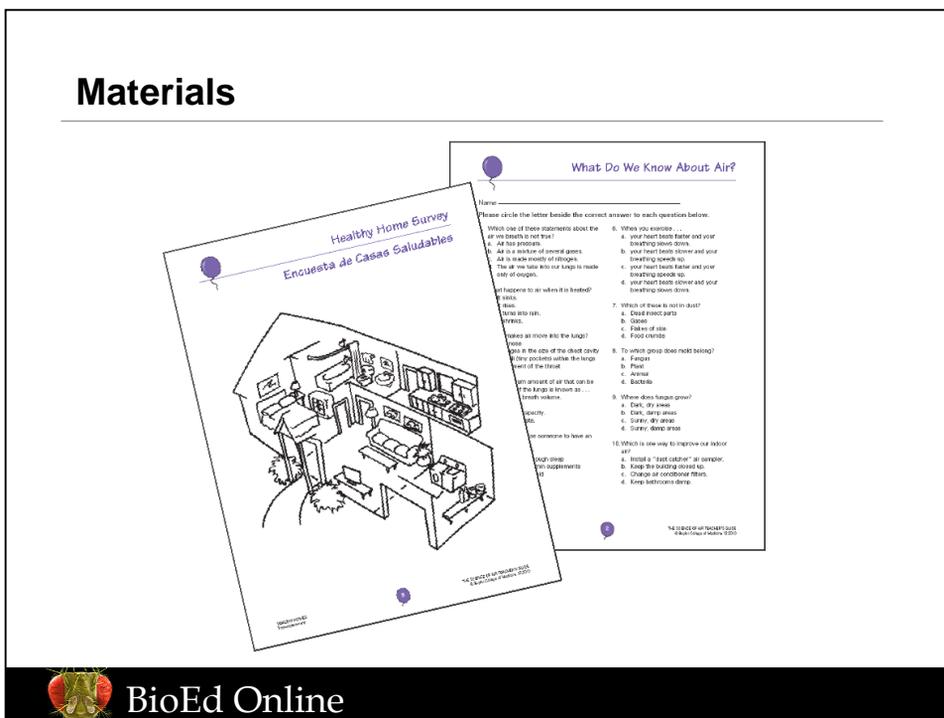
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Key Words

lesson, teaching slides, air, indoor air, air particle, ppm, odor, odors, dispersion, smoke, cigarette smoke, smoking, secondhand smoke, ETS, tobacco, fumes, chemicals, cleaners, pesticides, paints, asbestos, lead, dust, asthma,

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Materials



Materials

Materials per Student

- Copy of “Healthy Home Survey” worksheet
- Copy of the pre-assessment, “What Do We Know About Air?” that he/she completed at the beginning of the unit

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How Clean is the Air in Your Home?

- What are some sources of indoor air pollution?
- Is dust a type of indoor air pollution?
- In your home, which room do you think contains the most indoor air pollution?



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How Clean is the Air in Your Home?

To focus the students' attention, ask, "Do you think the air in your home is clean?" Stimulate a discussion about different sources of indoor pollution. Challenge students to remember what they learned about air pollution in previous lessons.

Ask students to predict which room in their homes has the poorest air quality. Maybe the room with the cat litter box? Or maybe the garage, where gasoline fumes and vehicle exhaust particles can accumulate?

Have students list some of the things they have learned about indoor air. If you have used the My World Explorations mini-magazine and/or read the story, *Mr. Slaptail's Secret*, reference to either one might help to promote class discussion. Otherwise, simply initiate a review of what students have learned so far about indoor air pollution.

Remind students that there are many things we can do to improve the quality of the air we breathe at home. Stress that we must identify possible sources of indoor air pollution before deciding or knowing which actions are needed to make improvements.

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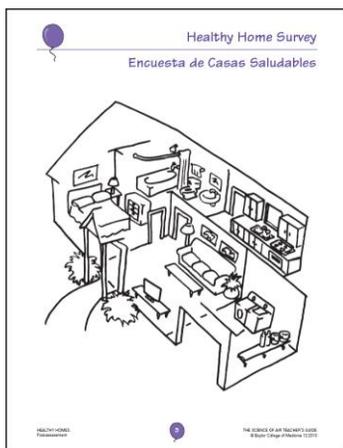
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Let's Get Started



- Complete the “Healthy Home Survey” worksheet at home.
- Have a family member or friend help you to fill out the survey.
- Circle or color areas on the survey that might contribute to indoor air pollution.



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Let's Get Started

In this activity, students will identify sources of potential indoor air pollution in their homes. They will discover that many forms of air pollution can be reduced or eliminated. Students will make and record observations, draw conclusions based on their investigation, and apply prior knowledge to a new situation.

Give each student a copy of the “Healthy Home Survey.” Have students take their pages home and use them to identify possible air pollutants in their homes. Stress that an older family member or friend should help them to complete the survey. Students should circle or color the areas on their sheets that represent potential contributors to indoor air pollution in their homes. Encourage students to draw any additional pollutants that they encounter while completing their surveys.

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Let's Talk About It

- As a class, make a list of indoor air quality hazards identified during the “Health Home Survey.”
- In what room(s) were most of sources of indoor air pollution located?
- How can we reduce or eliminate these hazards?
- Review the pre-assessment you completed at the beginning of this unit.
- As a class, discuss answers on the pre-assessment.



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Let's Talk About It

This activity allows students to identify sources of potential sources of indoor air pollution in their homes. Students may find that the air in their homes is more polluted than they thought. Emphasize that students should complete an indoor air pollution survey periodically, make sure they identify all possible sources of pollution.

Have students share their survey results as part of a class discussion. Create a list on the blackboard of different home air quality hazards identified, or make a transparency of the “Healthy Home Survey” and annotate it while projecting it as an overhead. After the list is complete, ask students to suggest ways in which sources of indoor air pollution can be limited or eliminated.

As an alternative or additional step, ask each student to write a paragraph describing his or her ideas for improving indoor air quality. Refer students to pages 28 and 29 of the Air unit's story, *Mr. Slaptail's Secret*. Ask them to find the different ways Mr. Slaptail's neighbors were able to eliminate indoor air pollution in his house.

Provide each student with the pre-assessment he or she completed at the beginning of the unit. Ask students if there are any questions that they would answer differently now. Have students use a different color ink to circle any new responses. On a separate sheet of paper, have students explain the reasoning behind their changes. Discuss students' new responses as a group.

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The Science of Indoor Air Pollution

- Indoor pollutants include tobacco smoke, pollen, dust mites and other sources, such as chemical cleaners and aerosol products.
- Pollutants are more highly concentrated indoors than outdoors because the air in modern homes is re-circulated.
- Pollutants travel through, and are dispersed in the air we breathe.



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The Science of Indoor Air Pollution

In this activity, students explored the following properties of air.

- **Many kinds of gases and particles travel through, and become dispersed in the air in our homes.** Among households with a fireplace or a family member who smokes, indoor pollutants can include gases such as carbon monoxide, as well as particles, like those that make up soot and tobacco smoke. Other indoor pollutants, such as pollen, spores, insect parts and droppings, and dust mites come from biological sources.
- **Substances in the air remain more concentrated in enclosed spaces.** Because many modern homes and buildings are designed to save energy by preventing air leaks or the introduction of outside air into heating or cooling systems, the concentration of many of these compounds is much higher indoors than outdoors. This often causes airborne chemicals and other substances to build up indoors.

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Image References

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http://en.wikipedia.org/wiki/Aerosol_spray#mediaviewer/File:Aerosol.png

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Extensions

- Is there indoor air pollution in your classroom or school?
- Conduct a “Healthy School Survey” to identify potential sources of potential indoor air pollution in your school or classroom.
- What can you do to reduce pollution in your classroom or school?



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Extensions

Encourage students to suggest variations of the investigation. For example, conduct a “Healthy School Survey” in your school building. Have students work in teams of 2–4, with each student surveying different parts of the building.

Bring the class together to discuss students’ findings, and make a list of possible improvements. Be sure to identify measures already being taken by the school to maintain a clean indoor environment.

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