

Asthma and the Air You Breathe

From: AMBIENT (<http://www.rsmas.miami.edu/groups/niehs/ambient/>)

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Abstract

During this lesson students will participate in a discussion about respiratory illnesses and their relationship to air and air quality.

Purpose – To engage children in studying the air and air quality as it affects family and friends who are afflicted with asthma and other respiratory illnesses.

Objectives

Students will be able to:

- i. List environmental factors that affect the health of the lungs.
- ii. Describe the symptoms of asthma.

National Science Education Standards

Content Standard D - STRUCTURE OF THE EARTH SYSTEM

The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations. Clouds, formed by the condensation of water vapor, affect weather and climate.

Content Standard D - EARTH IN THE SOLAR SYSTEM

The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface; this is due to the tilt of the earth's rotation on its axis and the length of the day.

Arizona Science Education Standards

Strand 6 - EARTH SCIENCE

Concept 1 – Structure of the Earth

PO 1. Describe the properties and the composition of the layers of the atmosphere.

PO 5. Describe ways scientists explore the Earth's atmosphere

Teacher Background

Asthma is a chronic illness that temporarily causes the airways to become narrow, causing difficulty in breathing and related anxiety. It is estimated that 20.3 million Americans (4 million children) suffer from asthma, which can be life threatening if not managed properly. Asthma is the leading cause of chronic illness of children in the United States, and most responsible for absenteeism from school.

Related and Resource Websites

<http://www.rsmas.miami.edu/groups/niehs/ambient/teacher/air/Tair.html>

http://www.airinfonow.org/html/ed_ozone.html

<http://www.airinfonow.org/html/o3profs.html>

<http://www.peds.arizona.edu/allergyimmunology/southwest/airpollution.html>

<http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=33316>

<http://www.fcs.okstate.edu/health/articles/asthma.htm>

<http://houseandhome.msn.com/Move/AsthmaHotSpots2003.aspx>

<http://www.azcentral.com/health/asthma/0225arizona26-ON.html>

<http://www.cdc.gov/asthma/default.htm>

Time 1 class period (45 minutes)

Preparation Time 5 minutes making copies

Materials Copies of Asthma Quiz

Teacher Preparation Copy quizzes

Activity

1. Ask students to list all the people they know who have respiratory illnesses making sure to tell who has what illnesses. You may want to prompt students with illnesses like asthma, allergies, emphysema, etc.
2. Have the students share their information with the class and assemble that data into a chart at the front of the room.
3. Tell your students, "Today we will be discussing air quality and asthma. To see what you already know, we will be taking a short quiz. Make your best guess if you don't know. I will give you the answers at the end of the quiz."
4. Pass quizzes out to students. To keep interest high, it might be preferable to take the quiz together and discuss the answers after each question. This gives the students a better opportunity to share what they already know. You may also opt to administer the quiz in its entirety and give answers after.
5. Ask students to write the following in their science notebooks (or on a paper to turn into you)...
 - 3 – things that they learned
 - 2 – things they think are important to share with their families
 - 1 – questions they still have

Asthma Quiz

Answer the following questions on asthma as well as you can given existing knowledge (**circle the correct answer**). The answers will be provided in a discussion following the "quiz."

1. Asthma is a common disease among children.
TRUE/FALSE
2. It is much less common for people to die from asthma now than it was twenty years ago.
TRUE/FALSE
3. Asthma cannot be triggered by changes in the weather, exercise or stress.
TRUE/FALSE
4. A person can catch asthma from someone else.
TRUE/FALSE
5. Two things that families can change in the home to reduce asthma attacks are:
6. Asthma is a chronic lung disease -- it cannot be cured but it can be controlled.
TRUE/FALSE
7. The American Lung Association estimates that 1 million children in the United States suffered from asthma attacks last year.
TRUE/FALSE
8. Some young children "grow out" of their childhood asthma.
TRUE/FALSE
9. Over-the-counter asthma medications are OK for managing asthma.
TRUE/FALSE
10. Hospitalization rates for asthma among African-American children are higher than for those who are white or Hispanic.
TRUE/FALSE
11. Many more kids have symptoms of asthma than have been diagnosed as having asthma by a doctor.
TRUE/FALSE
12. Tucson is a great place to live if you have asthma because it is so dry.
TRUE/FALSE
13. Three triggers that may cause or worsen asthma are:
14. Poor diet can contribute to higher rates of asthma.
TRUE/FALSE

KEY Asthma Quiz

1. **TRUE** - It is the number one cause of hospital admissions for children aged 1-9, and the number two cause of hospital admissions for children aged 10-14. The average number of lost school days for an asthma attack is 7.3 lost days per attack.
2. **FALSE** - Death from asthma, though rare, is increasing. Between 1980 and 1993, the mortality rate for children from asthma has risen 78% according to the Centers for Disease Control.
3. **FALSE** - All these factors can trigger asthma attacks for certain individuals.
4. **FALSE** - Asthma is not a contagious or infectious lung disease (unlike tuberculosis). A tendency to develop asthma can be passed from parents to children through their genes, and exposures in the home environment can do much to worsen or minimize asthma. See #5 below.
5. Many things can be done in the home to reduce asthma attacks including:
 - Eliminate smoking in the home.
 - Dust frequently (when asthma sufferers are not around).
 - Reduce dust gathering items like books, magazines, stuffed animals.
 - Run the fan or AC with a good filter in place.
 - Keep indoor humidity low.
 - Keep pets out of bedrooms, shampoo pets often.
 - Enclose mattresses, pillows to control dust mites.
6. **TRUE** - Once someone has asthma they may not have symptoms for long periods. However, adult asthma is a chronic condition and the lungs show evidence of over-reactivity and obstruction even in the absence of symptoms.
7. **FALSE** - The American Lung Association estimates 4.0 million children suffered asthma attacks last year.
8. **TRUE** - This is true; however the number of cases of true "childhood asthma" which subsides on its own around the age of four makes up only about 25% of diagnosed cases in children. Even if the asthma goes away, it can return again or develop as an apparently new disease in adulthood. Parents should never count on asthma going away on its own. Active management by a doctor can prevent the illness from progressing.
9. **FALSE** - Overuse of drugstore asthma medications can be deadly! The medicine can decrease the user's sensitivity to the medication over time, allowing the asthma to worsen without detection. Asthma sufferers should see a doctor for treatment and monitoring.
10. **TRUE** - In much of the US, asthma rates are higher for low-income African-American and Hispanic children. Asthma is more prevalent among children of African American descent, more severe in its presentation and less likely to be controlled with correct medications. Hospitalization rates among African-American children aged 0- 4 are twice that for Caucasian children aged 0-4; they are three times higher for African-American children between the ages of 5-14 than for Caucasian children between the ages of 5-14.
11. **TRUE** - It is estimated that between 15 and 25% of children in the highest risk areas are suffering from symptoms of undiagnosed and uncontrolled asthma.
12. **FALSE** - Tucson was actually ranked number one in the top ten most challenging asthma hot spots. About 95,000 people in Tucson have asthma. Tucson has a high asthma prevalence, high asthma mortality, and few physicians in asthma-related specialties, according to Sperling's Best Places.
13. Triggers that may potentially worsen asthma are:
 - Stress/Excitement
 - Changes in temperature, humidity
 - Extreme cold or heat
 - Pet hair, dander
 - Smoke (from fire, cigarettes, incense, etc.)
 - Dust, dust mites
 - Food Air pollution
 - Mold
 - Exercise
 - Ozone
14. **FALSE** - Diet has no clear connection with asthma, except in cases where people have a specific food allergy.