Blue light is scattered more than other wavelengths by the gases in the atmosphere, giving Earth a blue halo when seen from space onboard ISS at a height of 402–424 km. Photo courtesy of The Gateway to Astronaut Photography of Earth.

What Is Air?

The Science of Air: Activity 1

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What Is Air? (activity and pre-assessment)

This activity's objectives are aligned with the National Science Education Standards, specifically those related to Science as Inquiry and Physical Science. It allows the teacher to estimate students' prior knowledge of science related to air, gases, breathing and respiration, indoor air, and environmental health. The unit uses "indoor air" a theme to engage students in learning about their immediate environments, and how their own health is influenced by their surroundings.

Concept

Allows teacher to estimate students' prior knowledge related to air, gases, breathing and respiration, and environmental health.

Reference

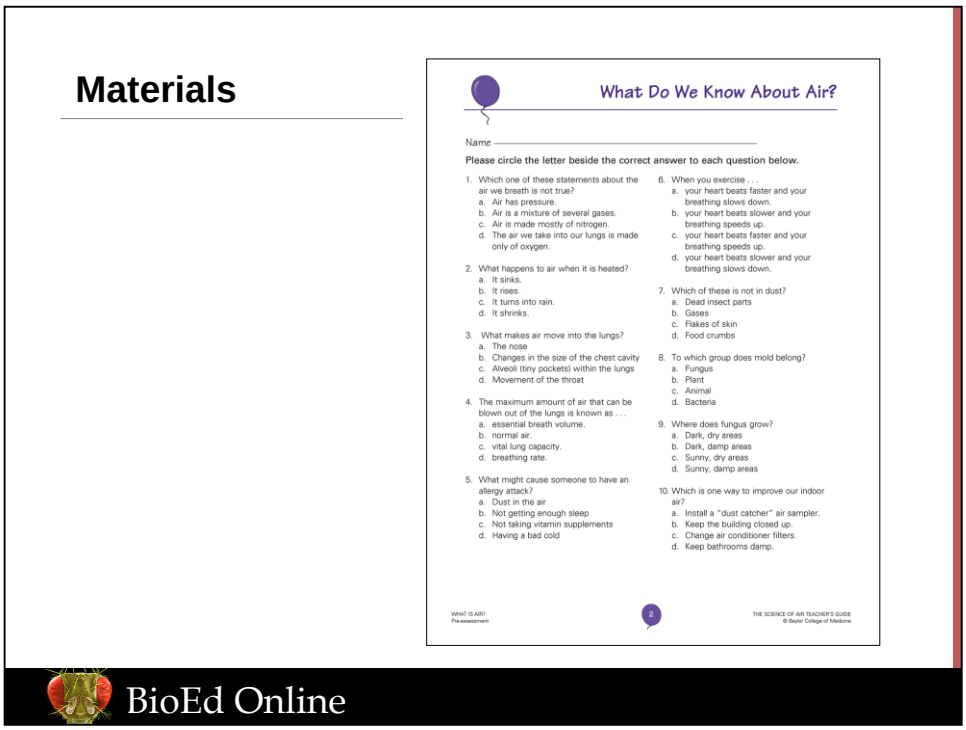
Moreno N., B. Tharp, and J. Dresden. (2011). *The Science of Air Teacher's Guide.* Third edition. Baylor College of Medicine. ISBN: 978-1-888997-74-3. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health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

Image Reference

Photo courtesy of The Gateway to Astronaut Photography of Earth, NASA JSC.
http://eol.jsc.nasa.gov/scripts/sseop/photo.pl?mission=ISS013&roll=E&frame=54329

Key Words

lesson, slides, teaching slides, lesson demonstration, science, life science, environment, air, air quality, indoor air quality, gas, gases, oxygen, carbon dioxide, photosynthesis, gas molecule, pollen, dust, smoke, allergies, asthma, lungs, vital lung capacity, dust, mold, pollution, pollutant, health,



Materials

Teacher Materials

•Several sheets of chart paper to record and display student questions. If room is available, leave the questions up as you work through all of the activities in the Air unit teacher's guide.

Materials per Student

•Copy of the student page.

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Key Words
materials needed, materials list,

What Do You Know About Air?

To focus students for this activity, begin by asking *What makes up air?* Stimulate a class discussion about properties of air. Challenge students to share what they know about air. To narrow the conversation, you also may want to ask, *Of what substance is air made? Can we see air? Does air move?" Are there pollutants in air—and if so, what kind?* and *Are pollutants bad for our health?*

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Image Reference

Photo of ash clouds from a vent on Kilauea volcano courtesy of NASA Earth Observatory.
http://eoimages.gsfc.nasa.gov/images/imagerecords/84000/84370/June27flow_USGS_pho_2014253_lrg.jpg

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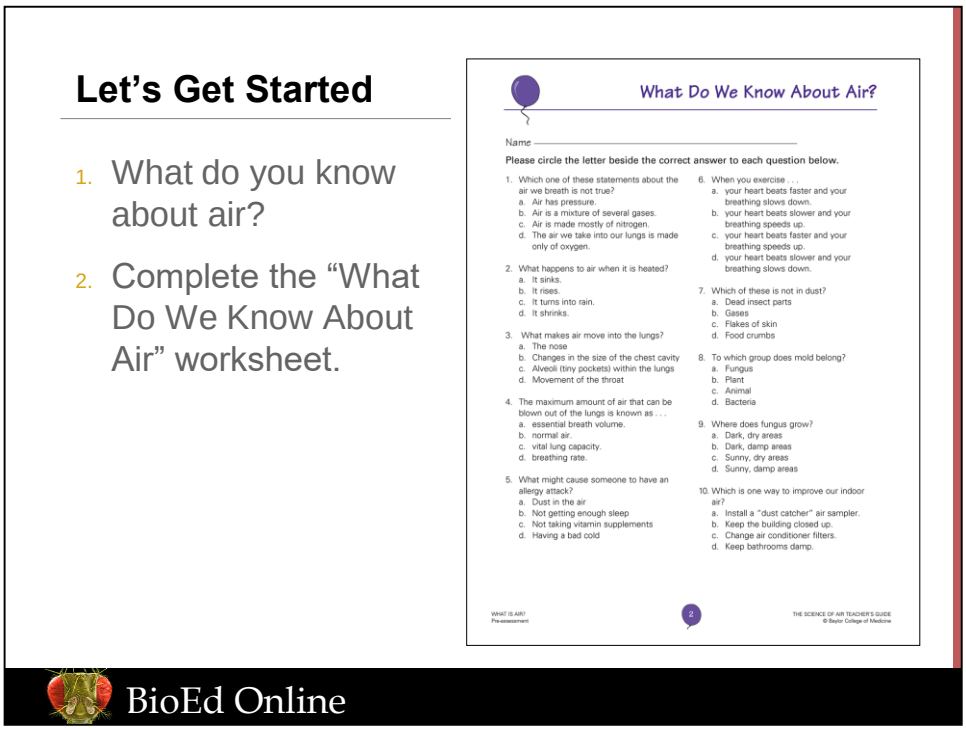

Let's Get Started

This activity should be introduced and summarized as a whole-class discussion. Students will assess how much they know about the properties of air, and will discover that there are many things to learn. They will work individually to complete a pre-assessment worksheet. In addition, students will observe, draw conclusions, and apply prior knowledge to a new situation.

Give each student a copy of the "What Do We Know About Air?" worksheet. Ask students to give their best answers to ALL questions, even if they are uncertain. Ensure them that future class discussions will allow them to correctly answer all questions by the time they finish the unit.

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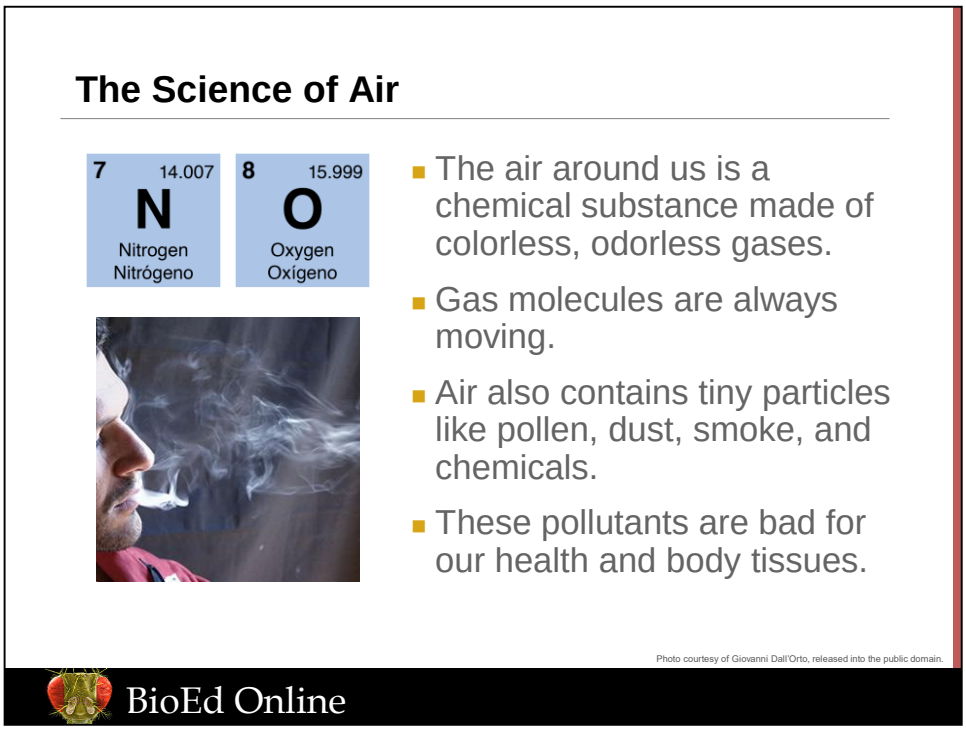

The Science of Air

The following properties of air may be discussed in this activity.

•**Air is made up of a mixture of gases.** The air around us is a chemical substance made of colorless, odorless gases. One of these gases, oxygen, is necessary for living cells to function. Another gas in air, carbon dioxide, is produced as a waste by most living things, and also is required for photosynthesis.

•**Gas molecules are always moving.** Because heat increases the movement of gas molecules, warm air rises and cool air sinks.

•**Air also contains tiny particles.** Some substances in air, such as pollen, dust or smoke, can cause susceptible people to develop allergies or asthma. Other substances, such as chemicals, can be toxic to everyone. Pollutants frequently become concentrated in indoor environments, where there is limited circulation of fresh air.

Note:

Element: Nitrogen. Atomic number = 7. Standard atomic weight = 14.007. Standard atomic weight based upon ^{12}C.

Element: Oxygen. Atomic number = 8. Standard atomic weight = 15.999. Standard atomic weight based upon ^{12}C.

Reference

1.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.
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2.Standard measurements courtesy of the National Institute of Standards and Technology, U.S. Department of Commerce.

Image Reference

Photo courtesy of Giovanni Dall'Orto, released into the public domain. http://commons.wikimedia.org/wiki/File:Stefano,_smoking_3_-_Foto_Giovanni_Dall%27Orto,_August_2007.jpg

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