

## Sustainability: Air

### The Essential Question

How do my actions impact the air we breathe?

### Overview

The air we breathe has no boundaries. What we put in the air ends up in someone else's lungs. According to the American Lung Association, in 2001, over 6 million American children and close to 14 million American adults suffered from asthma. We also know that the quality of the air has a negative impact on the ozone layers and that many cities issue ozone warnings. Not only is the quality of our outside air a concern, but we also are learning that the air we breathe in schools and our homes may be hazardous.

### The Challenge

Improve the air you breathe.

### Guiding Questions

Guiding questions direct the research of the challenge topic.

### Examples

- What is the composition of air?
- How is air quality defined?
- What is the quality of the air in my home and community?
- What impacts air quality?
- How does air quality impact plants and animals?
- How can air quality be improved?

### Guiding Activities

These activities assist students with answering the guiding questions and set the foundation for them to develop insightful and realistic solutions. They can be student or teacher directed. The student teams may begin with these activities but will need to seek out new ones to answer their questions. The goal is not to create a prescribed path to a solution but to provide guidance when needed.

### Examples

- **Learn About Air**

Students explore the guiding resources to gain background knowledge on the atmosphere and air quality.

- **Create a Virtual Environment**

To learn about the impact of airborne pollutants, students create two terrariums, introduce different pollutants to one, and compare their impact on the plants.

- **How Is the Air Quality in My Community?**

Students visit the [airnow.gov](http://airnow.gov) website (see “Guiding Resources”) and determine the quality of the air in their location. They identify the major types of pollution and determine their sources.

- **How Is the Air Quality in My School?**

Students use the Indoor Air Quality Tools for Schools Action Kit to investigate indoor air problems. The kit is provided by the U.S. Environmental Protection Agency (see “Guiding Resources”).

- **Cost Benefit Analysis**

What is the cost of clean air? Students research what it costs companies to modify their process to meet air quality regulations. They explore how that impacts the cost of products. They also interview local companies to see how they protect air quality and what it costs them.

## Guiding Resources

This is focused content that supports the activities and assists students with developing a solution. The ingredients include websites, videos, podcasts, experts, and other resources.

### Examples

- **AIRNow Air Quality Index (AQI)**

This cross-agency U.S. government site has an index for reporting daily air quality. It tells you how clean or polluted your outdoor air is and what associated health effects might be a concern.

<http://airnow.gov>

- **Indoor Air Quality**

This Environmental Protection Agency site provides information about indoor air quality.

[www.epa.gov/iaq](http://www.epa.gov/iaq)

- **Indoor Air Quality Tools for Schools Program**

The IAQ TFS Action Kit, most elements of which can be downloaded from this Environmental Protection Agency site, shows schools how to carry out a practical plan to improve indoor air problems.

[www.epa.gov/iaq/schools/toolkit.html](http://www.epa.gov/iaq/schools/toolkit.html)

- **Ground-level Ozone**

This Environmental Protection Agency site includes general information on ozone and ground-level ozone.

[www.epa.gov/air/ozonepollution](http://www.epa.gov/air/ozonepollution)

- **Major Air Pollutants**

This PDF document provides a list of major air pollutants, their sources, and their effects.

[www.ciese.org/curriculum/airproj/docs/major\\_air\\_pollutants.pdf](http://www.ciese.org/curriculum/airproj/docs/major_air_pollutants.pdf)

- **Pollution in Your Community**

At this site, you can get an in-depth pollution report for your county, covering air, water, chemicals, and more.

[www.scorecard.org](http://www.scorecard.org)

- **Air Pollution and Respiratory Health**

This site presents information about air pollution from the Centers for Disease Control and Prevention.

[www.cdc.gov/nceh/airpollution](http://www.cdc.gov/nceh/airpollution)

- **Air Quality**

This video podcast from University of California Davis covers topics related to air quality.

<http://deimos3.apple.com/WebObjects/Core.woa/Browse/ucdavis-public.1454546375>

## **Solution/Action**

The challenges are stated broadly enough to allow for a variety of solutions. Each group of students will base its solution on what students learned as they moved through the guiding activities. Any solution must be concrete and actionable.

### **Example**

Students investigated the air quality issues in their school using the Indoor Air Quality Tools for Schools (IAQ TFS) Action Kit provided by the Environmental Protection Agency. This in-depth program contained all of the content they needed to analyze, correct, and prevent indoor air quality issues in schools across the district. Using the information they learned, they created a series of video public service announcements that were distributed to all schools. They made presentations to the district executive team and board resulting in the adoption of district-wide policies and educational programs concerning school air quality.