

Instructional Scenario

Clearing the Air



Course/Duty Area: Introduction to Natural Resources & Ecology Systems/Protecting the Atmosphere

Scenario:

Your locality's government has recently received complaints from residents about poor air quality. Some citizens report increased asthma symptoms, while others have noticed haze in the air during certain times of the year. Concerns have been raised about possible sources, including vehicle emissions, agricultural practices, and seasonal outdoor burning.

The locality has reached out to your environmental science class to act as a team of environmental consultants. Your job is to investigate the causes of declining air quality, identify pollutants and their sources, and recommend realistic solutions that balance environmental protection with agricultural and community needs. Your team must present findings and recommendations to a mock "community board" made up of classmates and stakeholders.

Big Question:

How can we protect and improve air quality in the community while balancing environmental, agricultural, and human needs?

Focused Questions:

- What are the layers of the atmosphere, and where are most gases concentrated?
- What gases make up the atmosphere, and what role does water vapor play?
- What is *ozone*, why is it important, and how do CFCs affect it?
- How do human activities impact the atmosphere and contribute to climate change?
- What are *biogeochemical cycles*, and how does the atmosphere regulate them?
- What are the major air pollutants, and what are their main sources?
- What is *smog* and *particulate matter* (PM), and how do they form?
- How does air pollution affect human health and the environment?
- What methods are used to reduce air pollution and improve air quality?
- How can individuals and communities reduce their contribution to air pollution?

Student Project or Outcome:

Students will work in teams to create an Air Quality Action Plan. Each team must

- explain the structure and function of the atmosphere
- identify key pollutants and their sources (including agriculture)
- analyze local or regional air quality concerns
- propose realistic, science-based solutions
- include both community-level and individual-level recommendations.

Final products may include

- presentation (Google Slides, Canva, etc.)
- infographic or public awareness campaign
- mock town hall presentation.

Project-Based Assessment:

- Students will research real-world air quality data (e.g., EPA AirNow, local reports).
- Students will analyze case studies of air pollution events (e.g., smog, ozone depletion).
- Teams will present their Air Quality Action Plan to a mock panel.

Assessment will be based on

- scientific accuracy
- use of evidence
- connection to real-world practices (especially agriculture)
- feasibility of solutions
- clarity of communication.

Teacher Resources:

- [AirNow](#), Environmental Protection Agency
- [Climate Change](#), National Aeronautics and Space Administration (NASA)
- [Climate](#), National Oceanic and Atmospheric Administration
- [Virginia Department of Environmental Quality \(DEQ\)](#)
- [Natural Resources Conservation Service \(NRCS\)](#), U.S. Department of Agriculture
- [Environmental and Natural Resources Career Development Event \(CDE\)](#), National FFA

Scenario submitted by Erin Hannah, Chancellor High School, Spotsylvania County Public Schools