



A HISTORY OF AIR POLLUTION EVENTS

Air pollution is nothing new. In medieval England, where burning coal was the primary method of heating, the black smoke from chimneys created problems. The King issued proclamations to regulate the use of coal, but this failed to solve the problem. Hundreds of years later, in 1952, a five-day temperature inversion in London trapped fog laden with pollutants created by burning coal. More than 4000 deaths were attributed to this deadly “black fog.” Similar incidents claimed 1000 lives in 1956 and 700 lives in 1962.

Here in the United States, we have our own history of air pollution incidents:

- Early 1900s** The City of Chicago, Illinois passes an ordinance to reduce the “smoke” emitted by local factories.
- 1940s** Los Angeles, California becomes one of the first cities in the U.S. to experience severe air pollution problems then called “gas attacks.” L.A.’s location in a basin like area ringed by mountains makes it susceptible to accumulation of auto exhaust and emissions from local petroleum refineries.
- 1948** Air pollution kills in Donora, Pennsylvania. An unusual temperature inversion lasting six days blocks dispersal of emissions from zinc smelting and blast furnaces. Out of a total population of 14,000 people, 20 die, 600 others become ill, and 1400 seek medical attention.
- 1950** A chemist at the California Institute of Technology proposes a theory of smog (or ozone) formation in which auto exhaust and sunlight play major roles.
- 1954** An early public protest against air pollution takes place in East Greenville, Pennsylvania. Homemakers march on the town council to demand that a local casket manufacturer be required to stop polluting. Their complaint is that clean laundry hung out to dry became dirtier than before it was washed because of high levels of soot (or particulates) in the air.
- 1954** Visibility is drastically reduced by dense smog in Los Angeles. Air pollution is blamed for causing 2000 auto accidents in a single day.
- 1954** A group of University of Southern California students watch as the tie worn by one student changes color before their eyes. Later, chemical engineers determined that dyes in the fabric of the tie reacted with certain air pollutants occurring at particularly high levels that day.
- 1962** *Silent Spring* is published. Rachel Carson’s powerful book draws the attention of the American public to the potential consequences of the increasing ability of human activities to significantly and even permanently alter the natural world.



- 1966** In New York City, a three-day temperature inversion over Thanksgiving weekend is blamed for the deaths of 168 people.
- 1969** Millions of Americans watch via satellite as Neil Armstrong becomes the first person to walk on the moon. The same weekend, a very different news story startles the nation. Sulfur dioxide pollution emitted by industries near Gary, Indiana and East Chicago becomes potent acid rain that burns lawns, eats away tree leaves, and causes birds to lose their feathers.
- 1969** A vivid color photograph of Earth from space, widely distributed, shifts human perceptions of our planet. The Earth no longer seems vast but is recognized as a small, fragile ball of life in the immense infinitude of cold, black space.
- 1970** The first Earth Day becomes part of American history. Millions of students and citizens attend teach-ins and rallies to learn about environmental concerns and speak for environmental protection.
- 1972** Representatives of 113 nations, gather at a United Nations Conference on the Human Environment in Stockholm to develop plans for international action to protect the world environment.
- 1978** Rainfall in Wheeling, West Virginia is measured at a pH of 2, the most acidic yet recorded and 5000 times more acidic than normal rainfall.
- 1981** Air pollution enters international politics when the Quebec Ministry of the Environment notifies the U.S. that 60 percent of the acid rain (sulfur dioxide pollution) damaging air and waters in Quebec, Canada comes from the U.S. industrial sources in the Midwestern and Northeastern U.S.
- 1982** The National Center for Health Statistics releases a study indicating that four percent of all U.S. schoolchildren, including about 12 percent of all African-American preschoolers, have high levels of lead in their blood. About 675,000 children are at risk of kidney damage, brain damage, anemia, retardation, and other ills associated with lead poisoning. It is recognized that children absorb this lead by breathing air laden with lead pollution, primarily from leaded gasoline.
- 1985** The U.S. EPA estimates 50,000 streams in the U.S. and Canada are dead or dying because of acid rain pollution.
- 1986** The National Academy of Sciences reports that the burning of coal, gasoline, and other fossil fuels is definitely linked to acid rain and the death of trees, fish, and lake ecosystems in both the U.S. and Canada.
- 1992** The Earth Summit in Rio de Janeiro, Brazil is the most comprehensive international conference on the environment to date. Representatives from 188 countries and 35,000 participants attend. Two treaties are signed by all but a few nations present. The U.S. does not sign. One treaty on global warming recommends curbing emissions of greenhouse gases. The second treaty requires inventories of plants and wildlife and strategies to protect endangered species.

Source: *Students for Clean Air*. Clean Air Program. Pima County Department of Environmental Quality. Tucson, Arizona.



A HISTORY OF AIR POLLUTION LEGISLATION

- 1955** Air Pollution Control Act - This law provided for pollution research by the U.S. Public Health Service and provided technical assistance to local areas. The law considered the federal government's role to be solely advisory and treated air pollution as a local problem, which states had the right to regulate or not.
- 1960** Air Pollution Control Amendments - This amendment to the Air Pollution Control Act initiated research into the effects of motor vehicle exhaust on human health. When the initial study revealed direct, hazardous effects, additional research funds were provided in 1962.
- 1963** Clean Air Act - This law was an important first step in our national air pollution control program. It provided funds for research on the sources and effects of air pollution. It was the first federal legislation to acknowledge that air pollution was not a local problem, but a problem that crossed the boundaries of local and state jurisdictions. Through this act the federal government began to publish national air quality standards, although these were only recommendations. The federal government had very little enforcement power, and air quality issues remained primarily a local concern.
- 1965** Motor Vehicle Air Pollution Control Act - This legislation acknowledged that autos were a significant source of air pollution and recognized that it was economically and technologically feasible and appropriate to set vehicle emission standards on a national level rather than at the local level.
- 1967** Clean Air Act Amendments - This legislation converted the air quality criteria requested in 1963 into requirements and listed specific regions known for air pollution problems as special air quality control regions. States still retained primary responsibility for implementing air quality standards.
- 1970** National Environmental Policy Act (NEPA) - This law stated plainly that it was the duty of the U.S. government to "encourage productive and enjoyable harmony between man and his environment" and encouraged the President to create two environmental agencies: (1) the Council on Environmental Quality, based out of the White House, to advise the President; and (2) the Environmental Protection Agency, to assume responsibility for environmental regulation and protection.
- 1970** Clean Air Act Amendments - The 1970 Clean Air Act launched an ambitious national campaign to reduce air pollution. This 1970 legislation is still the basis of our national air pollution prevention program. It expanded air quality control to all areas, not just those specifically named in previous legislation. It also funded more extensive air quality and pollution research than had been done before. Another result of this law was the establishment of required (not just recommended, as in 1963) National Ambient Air Quality Standards (NAAQS) for six criteria pollutants. To ensure compliance with these standards, the law initiated regulation of both stationary and mobile sources of air pollutants. States were required to develop plans as to how they would meet clean air standards in polluted areas. Optimistic compliance deadlines in the law, however, were often not achieved, and many regulations were waived and enforcement actions delayed. This law also permitted citizens to bring lawsuits against violators of the NAAQS.



- 1974** Energy Supply and Environmental Coordination Act - A result of the Arab Oil Embargo, this law granted EPA the authority to delay or waive auto and other emission standards.
- 1975** Energy Policy and Conservation Act - This law set fuel economy standards and hastened the appearance of more fuel-efficient U.S. auto engines.
- 1977** Clean Air Act Amendments - This law involved many compromises. It de-emphasized federal responsibility in air quality issues, limited EPA authority, and relaxed some of the guidelines of the 1970 version of the Clean Air Act. It extended the time frames for states with polluted areas to develop and implement a plan to improve their air quality. It also relaxed the standards for emission from new cars. This law did not include guidelines for controlling new sources of air pollution, such as new or expanded industrial plants. However, a complex set of rules allowed some plants to avoid the regulations. Finally, this law allowed EPA to bring limited civil and criminal penalties against polluters.
- 1990** Clean Air Act Reauthorization - This ambitious act sought to drastically improve air quality by the year 2005. This intensified national effort to reduce air pollution remains one of the biggest undertakings in the history of environmental regulation. The act encouraged innovative pollution-prevention measures and energy conservation. Its principal features included:
- ◆ stricter guidelines and timelines for controls that must be implemented in areas that do not meet air quality standards;
 - ◆ tough new emission standards for motor vehicles, requiring a reduction in emissions of about 50%;
 - ◆ requirements for the petroleum and auto industries to produce alternative (clean-burning) fuels and vehicles able to use them;
 - ◆ development of new control standards for sources of 189 toxic pollutants, beyond the six criteria pollutants;
 - ◆ to reduce acid rain, a required 50% reduction in emissions from coal-burning power plants;
 - ◆ to reduce depletion of stratospheric ozone, restrictions on the use of chloroflourocarbons (CFC's); and
 - ◆ stronger enforcement authority for EPA, including greater criminal sanctions for polluters who do not comply with clean air regulations.

These new guidelines will take as much as 20 years to fully implement. Also, although the legislation is strict, achievement of its goals is dependent on an aggressive enforcement effort by EPA as well as on the level of funding allocated to EPA in the federal budget.

Source: *Students For Clean Air*. Clean Air Program. Pima County Department of Environmental Quality. Tucson, Arizona



High School and Middle School Air Quality Education Program

EDUCATIONAL RESOURCE MATERIALS

AUDIO VISUALS

Air Pollution: Outdoor. A 16-minute video that examines how fuels burn, combustion by-products, filtering, recycling and safe disposal of pollutants, and recent research on cleaner fuels and combustion methods. [A companion film to *Air Pollution: Indoor*.] Available through Films for the Humanities and Sciences (1-800-257-5126)

Breathe. Explains the connection of air, smog and ozone exposure to human health effects and to crop deterioration. Pub/author: EPA (617)547-2073.

Driving Smart for Clean Air. A 10-minute video presenting alternatives to driving to work alone. Contact San Diego Air Pollution Control District, (619)-694-4333.

GIS Mapping the Way for Better Decisions. A Public GIS Data Release Pilot Project by the Delaware Department of Natural Resources & Environmental Control Delaware Coastal Management Program. A CD ROM of all three counties in Delaware with TRI information.

Indoor Air Quality—A Cause for Concern. Louisiana Department of Environmental Quality. 504-765-0169 or <http://www.deq.state.la.us/oarp/oarp.htm>

In Partnership With Earth: Pollution Prevention For The 1990's. Excellent video narrated by John Denver about living in harmony with the earth and its resources. Pub/Author: EPA

It's Time To Clear The Air. A 15-minute video tape that explores ways that you can decrease air pollution in neighborhoods. Puget Sound Air Pollution Control Agency. Seattle: 296-5100.

Let's Clear the Air. A 15-minute filmstrip or slidetape. National Wildlife Federation, 1412 16th St. NW, Washington, D.C. 20036-2266, 1-800-432-6564.

Living Well America; Environmental Update. A 18-minute video tape. 515 North State Street, Chicago, Illinois 60610. (206) 312-464-5395.

On the Road to Green Driving. A 10-minute video tape. Puget Sound Air Pollution Control Agency. Seattle: (206) 296-5100.

Ozone: Double Trouble: A 17-minute video tape that provides clear explanations of the importance of the ozone layer and the causes and problems related to its depletion, as well as causes and problems associated with ground-level ozone pollution. Contact Environmental Programs, Industrial Extension Service, College of Engineering, North Carolina State University.



Proton Dan Explores Open Air Refuse Burning: A 13-minute video tape that explains the hazards of open burning and the alternatives to open burning. Contact DNREC: (302) 739-4506 or from the Delaware Teachers Center (302) 736-6723.

Puget Sound State of the Air. A 15-minute video tape. Puget Sound Air Pollution Control Agency. Seattle: (206) 296-5100.

Road to the Future. A 58-minute video that focuses on four very different U.S. metropolitan areas and the problems and solutions related to providing effective transportation in an urban environment. Available through Films for the Humanities and Sciences (1-800-257-5126)

The Latest Weapon in the Battle Against Air Pollution. A 12-minute video that covers the benefits of oxygenated fuels using the testimony of a citizen's advocate, a toxicologist, and a fuels expert. Contact Clean Fuels Development Coalition, 7315 Wisconsin Ave., Suite 515 East Tower, Bethesda, MD 20814

The Search for Clean Air. A 90-minute video tape hosted by Walter Cronkite appeared on public television stations, and was purchased by Iowa DNR for loan to schools. Contact Iowa Air Quality Bureau at 515-281-7832.

The Search for Clean Air. A 58-minute video tape that is an exposition of the causes of air pollution, its effects on natural systems and human health, and varied perspectives on the issues involved in solving the problems. Winner of CINE Golden Eagle Award. Available through Films for the Humanities and Sciences (1-800-257-5126)

Tobacco: Fatal Addiction. A 25-minute video tape. CorVision, 1359 Barclay Boulevard, Buffalo Grove, IL 60089. 1-800-537-3130 or 708-537-3100.

User's Guide To Planet Earth, A: The American Environment Test. Tom Selleck hosts video that quizzes viewers on their environmental awareness.. Call Number VID 037; Aims Media, 9710 Desoto Av. Chatsworth Ca 91311-4300; (800)367-2467.

Yakety Yak: Take It Back. Excellent video with popular cartoon characters and current artists like Stevie Wonder, Pat Benatar, Natalie Cole, etc. stressing the need for pollution prevention-recycling, reusing, Take It Back Foundation (818)569-0552.

BOOKS, PAMPHLETS AND AIR CURRICULUMS

National Air Quality and Emissions Trends and Report, 1993. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 1994. A technical but very readable report, revised and released annually; includes coverage of long-term trends for each criteria pollutant and many clear charts, maps, and graphs.

Ozone: Will It Affect Me? Washington University, St. Louis, Missouri, 1995. Developed for use at the high school level; includes three units, each intended to cover two to six weeks: environmental science unit on tropospheric ozone and its health effects, biology unit on stratospheric ozone depletion and its effects, and chemistry unit on both tropospheric ozone pollution and stratospheric ozone depletion. Contact Washington University, #1 Brookings Dr., Campus Box 1229, St. Louis, MO 63130.

Sky High: An Air Quality Curriculum for Ventura County High School Students. Very regionally focused, but good activities for early high school students. Includes more math activities than most curricula on the subject. Contact Public Information Administrator, Ventura County Air Pollution Control District (805-645-1400)

Smart Drivers, Fuelish Choices. Arizona Department of Commerce, Energy Office, Phoenix, Arizona, 1989. High School to easy adult reading on autos and air quality; discusses how cleaner emissions have been offset by increasing population and auto use, and economic factors related to air quality; offers projects geared toward study of related problems.

Teacher's Guide to World Resources. World Resources Institute, Baltimore, MD, 1994. One unit, of two, in this activity book focuses on automobiles, the consequences of relying on automobiles as our primary mode of transportation, and automobiles as a factor in air pollution. The World Resources Institute has also published these research reports: *The Going Rate: What It Really Costs to Drive*; *Driving Forces: Motor Vehicle Trends and the Implications for Global Warming, Energy Strategies, and Transportation Planning*; and *Electric and Hydrogen Vehicles: Transportation Technologies for the 21st Century*.



The Inside Story: A Guide to Indoor Air Quality. U.S. Environmental Protection Agency, Office of Air and Radiation, Washington, DC, 1988. Useful as background reading for both educators and students, covers sources of home air pollution, how indoor air pollution affects health, and source-specific methods for controlling air quality in the home.

The Plain English Guide to the Clean Air Act. U.S. Environmental Protection Agency, Office of Air and Radiation, Washington, DE, 1993. Excellent overview of the Clean Air Act, including types of pollutants, sources, control programs, responsibilities of state versus federal government, etc.; could provide the basis of an interesting case study for government/civics classes.

WEBSITES AND ADDRESSES

NESEA Website - [http:// www@nesea.org](http://www@nesea.org)

Northeast Sustainable Energy Association
50 Miles St.
Greenfield, MA 01301
(413) 774-6051
Fax (413) 774-6053

DNREC - <http://www.dnrec.state.de.us>

EPA - <http://www.epa.gov>

GLEAA - Global Electric Auto Association (grassroots association of 2,000+ companies and individuals dedicated to leading the 'CHARGE' to electric vehicles
World Wide Web: <http://www.evnews.net>

Ozone - (Department of Environmental Quality - <http://www.deq.state.me.us/aqd>

Project Leap - www.state.in.us/idem/leap (indicators) (Learning and Environmental Awareness Partnership)

Acid Rain homepages:
<http://www.epa.gov/acidrain>
<http://www.epa.gov/acidrain/ardhome.html>
<http://www.epa.gov/acidrain/student/student2.html>

Clean Air - <http://www.tnrcc.state.tx.us/admin/topdoc/gi/235/toc.html>

Office of Air Quality - <http://www.tnrcc.state.tx.us/air/monops/lessons/ecobadgelesson.html>

Office of Mobile Sources (OMS) - <http://www.epa.gov/omswwww/quiz/>

Films for Educators
420 East 55th Street, Suite 6U,
New York, N.Y. 10022
Phone: (212) 486-6577
Fax: (212) 980-9826

Eco Badge Lesson Book - <http://www.ecobadge.com>

Internet Public Library - <http://ipl.sils.umich.edu/> - ipl@umich.edu



The InviroLink Network:
Suite 236, Hamburg Hall
5000 Forbes Ave.
Pittsburgh, PA 15213
(412) 268-7187 > voice
(412) 268-7036 > fax
e-mail: admin@envirolink.org

The Chemical Scorecard. A Chemical Information Service - <http://www.scorecard.org>
A great tool for Lesson 3: Industrial Impacts on Air Quality

Environmental Terms - <http://www.epa.gov/OCEPaterms/aaad.html>

<http://www.epa.airnow>



High School and Middle School Air Quality Education Program



Acid Rain: Rain which has heavy concentrations of nitric and sulfuric acid formed by the combination of *nitrogen dioxide* and *sulfur dioxide* with water vapor in the atmosphere. Can fall as rain, snow, or fog.

Aerosol: Extremely small particles or liquid or solid matter that can remain suspended in air for long periods of time.

Air: A gaseous mixture forming the atmosphere. The volumetric composition of air is—Nitrogen (78.09%); Oxygen (20.95%); Argon (0.93%); CO₂, Krypton, Neon, Helium, H₂, Xenon, Ozone (0.03%).

Air pollution: Excessive concentration of foreign matter in the air which adversely affects the well-being of the individual or causes damage to property.

Air pollutants: Any substance occurring in the atmosphere that may have adverse effects on humans, animals, plant life, and/or inanimate materials.

Alternative fuels: Any fuel other than gasoline or diesel; cleaner-burning fuels that can replace ordinary gas and produce less air pollution. Examples include methanol, ethanol, compressed natural gas, liquid propane gas, hydrogen and electricity.

Allergen: A substance capable of causing an allergic reaction because of an individual's sensitivity to that substance.

Area sources: Refers to such sources of pollution as gas furnaces, fireplaces, wood-burning stoves, and household products such as paints, thinners, aerosol sprays, etc. These locations are normally related to homes and other nonindustrial locations.

Atmosphere: The layer of air that surrounds our planet; Earth's atmosphere is composed primarily of *nitrogen* (78%) and *oxygen* (21%), along with *carbon dioxide*, argon, water vapor, and traces of other gases (less than 1% combined).

Attainment area: A geographic area in which levels of a criteria air pollutant meet the *National Ambient Air Quality Standard* for that pollutant.

Carbon dioxide (CO₂): A colorless, odorless gas which occurs naturally and is also created by fossil fuels *combustion*; some believe increased CO₂ levels contribute to the "greenhouse effect."

Carbon monoxide (CO): A colorless, odorless, poisonous gas created by incomplete *combustion* of carbon-based fuels (including wood as well as fossil fuels such as gas and oil) in motor vehicles, etc.; a *criteria air pollutant*; high-level exposure causes serious health effects or possible death.

Catalytic converter: A pollution control device for motor vehicles; helps reduce *emissions* by converting harmful pollutants to carbon dioxide and water; catalytic converters have been required on all new motor vehicles sold since 1984 (in California since 1976).



Chlorofluorocarbons (CCFCs): Substances containing chlorine, fluorine, and carbon; found in refrigeration systems, foam packaging, solvents, and propellants; rise to the upper atmosphere when released; responsible for depletion of the stratospheric *ozone layer* that protects Earth from the sun's harmful ultraviolet rays.

Clean Air Act: Federal legislation that provides the basis for air pollution control efforts throughout the U.S.; components of the new law are many-faceted and encompass emissions, standards, monitoring, enforcement, etc.

Combustion: Burning; a great deal of air pollution is a product of the process of combustion in homes, industry, motor vehicles, other internal combustion engines, etc.

Criteria air pollutant: An air pollutant for which acceptable levels of exposure have been established and for which the EPA has established an ambient air quality standard (see NAAQS); the current criteria pollutants include *carbon monoxide* (CO), *ozone* (O₃), *nitrogen dioxide* (NO₂), *sulfur dioxide* (SO₂), *particulate matter* (PM₁₀), and *lead* (Pb).

Emission: Release of *pollutants* into the air; also (especially in plural form) can refer to substances discharged into the air.

Emission inventory: Estimate of amount of air *pollutants* produced over a specific time period, such as a day or a year.

Emission standard: The maximum amount of a single *pollutant* that can be legally discharged from a source such as automobiles, smoke stacks, etc.

Enforcement: Legal methods used to press polluters to obey the *Clean air Act*; methods include citation, fines, jail terms; can be implemented by the *EPA* (through courts of law or statutory authority) or by citizen groups.

EPA (Environmental Protection Agency): Created in 1970, the EPA is the United States agency responsible for protecting the nation's natural resources, including air quality.

Fossil fuels: Fuels derived from decayed plants and animals that lived millions of years ago; include oil, natural gas, and coal; made primarily of *hydrocarbons*.

Greenhouse effect: Warming of the Earth beginning in the late 20th Century. Light energy from the sun which is absorbed by the earth's surface emerges as heat energy. When that heat energy is trapped by the atmosphere, the result is an overall warming effect. It is thought that the emission of CO₂ and other gases, such as methane, into the atmosphere contributes to this warming effect.

Hydrocarbons: Chemical compounds that contain combination of hydrogen and carbon atoms; a major group of the *volatile organic compounds*; a major contributor to air pollution; a precursor of tropospheric ozone.

Indirect source: Any facility, building, structure, or combination of these, that attracts mobile sources of air pollution; for example, shopping malls, airports, housing developments, parking lots or employment sites; see mobile source.

Indoor air pollution: Pollution of air inside buildings or other enclosed spaces. Examples include paint fumes, tobacco smoke, asbestos, etc.

Inversion: Refers to a warm layer of air which sits on top of a cooler layer, thus trapping pollutants.

Mobile sources: A non-stationary source of air pollution such as motor vehicles, boats, planes, etc. (as opposed to stationary sources such as power plants, refineries, and so on).

NAAQS (National Ambient Air Quality Standards): Federal standards established by the EPA for the maximum acceptable levels of specific pollutants based on human health and public welfare.

Nitrogen oxides (Oxides of Nitrogen, NO_x): Refers to combinations of nitric oxide, nitrogen dioxide, and other oxides of nitrogen. Nitrogen oxides are created as a result of the combustion process and contribute to smog and acid rain. Nitrogen dioxide is a criteria air pollutant and can cause serious health problems.



Nitrogen dioxide (NO₂): A criteria air pollutant; a major contributor to air pollution; produced by combustion of fuels; NO₂ is the most abundant of the nitrogen oxides (which include nitric oxide, nitrogen dioxide, and other oxides of nitrogen).

Nonattainment area: A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the National Ambient Air Quality Standard; approximately 60% of Americans live in nonattainment areas; see also attainment area.

Oxygenated fuel (oxyfuel): A special type of gasoline that burns more completely than standard gasoline in cold-start conditions.

Ozone: A toxic, chemical gas created when reactive organic compounds and nitrogen oxides react with sunlight to form an unstable version of oxygen, O₃. Ozone is a major component of smog and can cause serious health problems.

Ozone layer: A thin layer of ozone located in earth's upper atmosphere which helps keep out harmful UV rays from the sun. It is believed that the ozone layer is depleting as a result of chlorofluorocarbons emitted into the air.

Particulate Matter (PM₁₀): Refers to the microscopic particles of solid or liquid matter that are suspended in the air. Examples include soot, dust, aerosols, fumes, and mists. Particulate Matter is a major air pollutant and can cause health problems when particles enter the air sacs of the lungs.

Photochemical: Refers to any chemical reaction which occurs as a result of light energy from the sun. For example, ozone is formed through a photochemical reaction involving nitrogen dioxide and reactive organic compounds.

Pollutant Standards Index (PSI): A number used to indicate the severity of air pollution. For example, the higher the PSI, the higher the level of pollutants and the more severe the air pollution.

ROC (Reactive Organic Compounds) or ROG (Reactive Organic Gas): Sometimes referred to as Non-Methane Organic Compounds, ROG is a chemical gas composed of hydrocarbons that contributes to the formation of smog.

Smog: General name for a mixture of pollutants in the air. The major ingredient of smog is ozone, which is formed from the chemical reactions of several pollutants in sunlight.

SO₂ (Sulfur Dioxide): An invisible gas formed by the combustion of fossil fuels.

Source: Any site or object that emits pollutants; includes *stationary sources* and *mobile sources*.

Stationary sources: Sources of air pollution such as power plants, refineries, and manufacturing facilities (as opposed to mobile sources such as automobiles, buses, planes, etc.).

Stratosphere: A layer of the Earth's atmosphere, about 7 to 22 miles above the Earth's surface; see ozone layer.

Sustainable development: Balancing ecological projects with economic needs. Thus, a furniture manufacturer conserves forests both to maintain its future wood supply and to reduce greenhouse gases.

Toxic: Poisonous; causing injury or death if eaten, touched, inhaled, etc. in sufficient amounts.

Troposphere: The layer of the Earth's atmosphere closest to the Earth's surface; where weather occurs and where most air pollution is found.

Volatile Organic Compounds (VOCs): A volatile compound (capable of readily producing vapors) containing the element carbon (thus classified as an organic compound, although it may be synthesized by humans and not occur naturally); examples include gasoline, other hydrocarbons, solvents, and some industrial chemicals; also called reactive organic compounds; see also hydrocarbons.