Chapter 12 Air
Section 2: Air, Noise, and Light Pollution
E.Q. *What Causes Air Pollution?*

SEV3. Students will describe stability and change in ecosystems.

a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).

SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).

Objectives

- **Describe three possible short-term effects and long-term effects of air pollution on human health.**
- **Explain what causes indoor air pollution and how it can be prevented.**
- **Describe three human health problems caused by noise pollution.**
- **Describe solutions to energy waste caused by light pollution.**

Air Pollution

- **Air pollution can cause serious health problems, especially for people who are very young, very old, or who have heart or lung problems.**
- **Air pollution adds to the effects of existing diseases such as emphysema, heart disease, and lung cancer.**
- **The American Lung Association has estimated that Americans pay tens of billions of dollars a**

year in health costs to treat respiratory diseases caused by air pollution.

Short-Term Effects of Air Pollution on Health

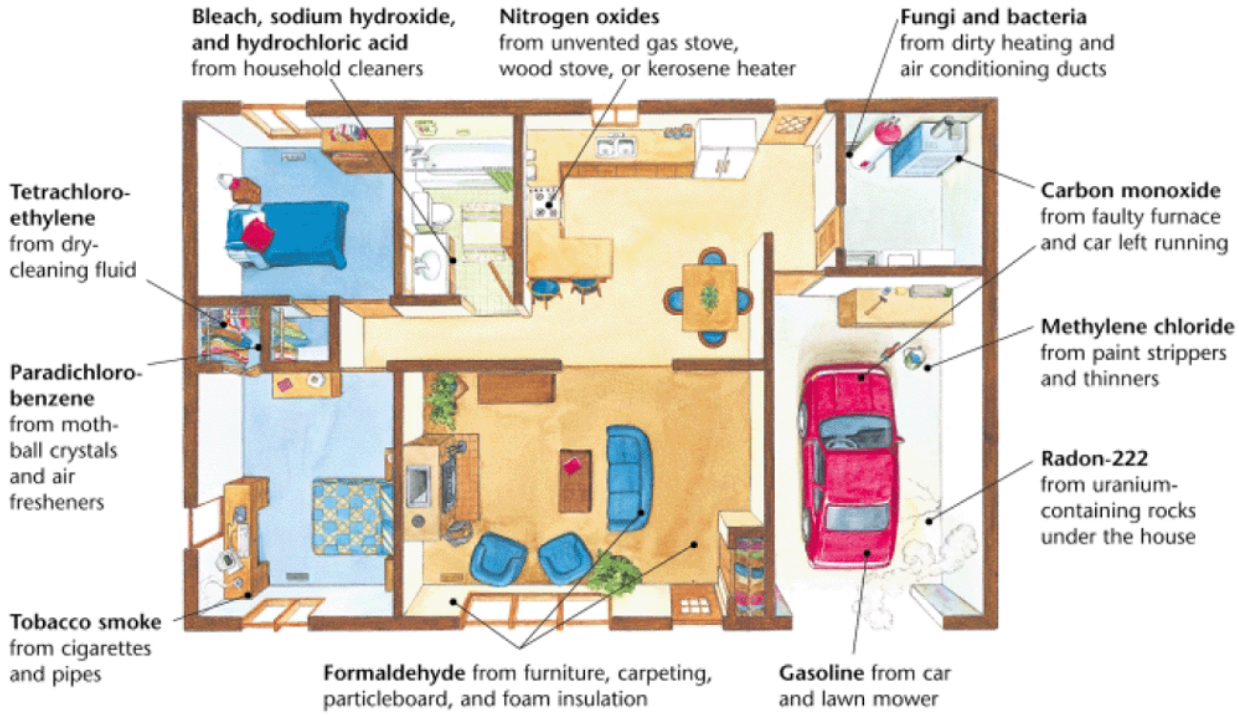
- **Many of the effects of air pollution on people's health are short-term and reversible if their exposure to air pollution decreases.**
- **The short-term effects of air pollution on people's health include headache; nausea; irritation to the eyes, nose and throat; coughing; tightness in the chest; and upper respiratory infections, such as bronchitis and pneumonia.**
- **Pollution can also make the conditions of asthma and emphysema worse for certain individuals.**

Long-Term Health Effects of Air Pollution

- **Long-term effects on health that have been linked to air pollution include emphysema, lung cancer, and heart disease.**
- **Long-term exposure to air pollution may worsen medical conditions suffered by older people and may damage the lungs of children.**

Indoor Air Pollution

- **The quality of air inside a home or building is sometimes worse than the quality of air outside.**
- **Plastics and other industrial chemicals are major sources of pollution.**
- **These compounds can be found in carpets, building materials, paints, and furniture, particularly when these items are new.**



- **<u>Sick-building syndrome</u> is a set of symptoms, such as headache, fatigue, eye irritation, and dizziness, that may affect workers in modern, airtight office buildings.**
- **Sick-building syndrome is believed to be caused by indoor air pollutants.**
- **Sick-building syndrome is most common in hot places where buildings are tightly sealed to keep out the heat.**

<u>Indoor Air Pollution cont</u>.

- **Identifying and removing the sources of indoor air pollution is the most effective way to maintain good indoor quality.**
- **Ventilation, or mixing outdoor air with indoor air, is also necessary for good air quality.**
- **When activities such as renovation and painting, which cause indoor air pollution, are undertaken, ventilation should be increased.**

<u>Radon Gas</u>

- **Radon gas is colorless, tasteless, odorless, and radioactive.**

- **Radon is one of the elements produced by the decay of uranium, a radioactive element that occurs naturally in the Earth's crust.**
- **Radon can seep through cracks and holes in foundations into homes, offices, and schools, where it adheres to dust particles.**
- **When people inhale the dust, radon enters their lungs. In the lungs, radon can destroy the genetic material in cells that line the air passages.**
- **Such damage can lead to cancer, especially among people who smoke.**
- **Radon is the second-leading cause of lung cancer in the United States.**

<u>Asbestos</u>

- **Asbestos is any of six silicate minerals that form bundles of minute fibers that are heat resistant, flexible, and durable.**
- **Asbestos is primarily uses as an insulator and as a fire retardant, and it was used extensively in building materials.**
- **However, for all of its uses, the government banned the use of most asbestos products in the early 1970s.**
- **That was because exposure to asbestos in the air is very dangerous.**
- **Asbestos fibers can cut and scar the lungs, causing the disease asbestosis.**
- **Victims of the disease have more and more difficulty breathing and may eventually die of heart failure.**

Noise Pollution

- **A sound of any kind is called a noise. However, some noises are unnecessary and can cause noise pollution.**
- **Health problems that can be caused by noise pollution include loss of hearing, high blood pressure, and stress.**
- **Noise can also cause loss of sleep, which may lead decreased productivity at work and in the classroom.**

Noise Pollution cont.

- **A decibel is the most common unit used to measure loudness, and is abbreviated dB.**
- **The quietest sound that a human ear can hear is represented by 0 dB. For each increase in decibel intensity, the decibel level is 10 times higher than the previous level.**
- **A sound of 120 dB is at the threshold of pain. Permanent deafness may come as a result of continuous exposure to sounds over 120 dB. Lengthy exposure to sounds more intense than 90 decibels can cause hearing damage.**

Intensity of Common Noises	
Noise	Intensity (dB)
Rocket engine	180
Jet engine	140
Rock-and-roll concert	120
Car horn	110
Chainsaw	100
Lawnmower	90
Doorbell	80
Conversation	60
Whisper	30
Faintest sound heard by the human ear	0

Sound Intensity Level	
Sound	**Intensity Level (decibels)**
Threshold of human hearing	0
Whisper	15–20
Normal conversation	40–50
Street noise	60–70
Inside a bus	90–100
Operating heavy machinery	80–120
Rock concert (in audience)	110–120
Threshold of pain	120
Jet plane (taking off)	120–160

Light Pollution

- **Light pollution does not present a direct hazard to human health, but it does negatively affect our environment.**
- **The use of inefficient lighting in urban areas is diminishing our view of the night sky.**
- **In urban areas, the sky is often much brighter than the natural sky.**
- **A more important environmental concern of inefficient lighting is energy waste. Energy is wasted when a light is directed upward into the night sky and lost to space. Examples include lighting on billboards, poor-quality street lights, and the lighting of building exteriors.**
- **Solutions to this problem include shielding light so it is directed downward, using time controls so that light is used only when needed, and using low-pressure sodium sources, which are the most energy-efficient sources of light.**