What is the relationship between environmental health and our own health?

**LESSON 1 An Overview of Environmental Health**
- Environmental health hazards can be biological, social, chemical, or physical.
- Epidemiology is the study of disease in human populations. Toxicology is the study of how poisonous substances affect the health of humans and other organisms.
- People respond differently to environmental hazards due to individual differences such as age, sex, weight, health issues, and genetic makeup.
- Risk assessment is the process of measuring the chance that an environmental hazard will cause harm.

**LESSON 2 Biological and Social Hazards**
- Infectious diseases are spread by direct human contact through contaminated food and water, and by animals.
- Since new diseases are continually emerging, it is important to know how, where, and to what extent they are spreading.
- Some social hazards result from lifestyle choices a person makes, while other social hazards cannot be controlled.

**LESSON 3 Toxic Substances in the Environment**
- All chemicals can be hazardous in large enough quantities.
- Chemical hazards can cause cancer, birth defects, and improper functioning of human body systems.
- Our homes and buildings may contain chemical hazards including asbestos, radon, volatile organic compounds, carbon monoxide, and lead.

**LESSON 4 Natural Disasters**
- Earthquakes occur as Earth’s plates scrape against each other. Earthquakes can destroy natural landforms as well as human-made structures.
- The molten rock, gas, ash, and cinders released during a volcanic eruption can cause significant damage and loss of life in nearby cities and towns.
- Tornadoes, hurricanes, and thunderstorms are powerful weather events that can damage property and threaten human lives.
- An avalanche is a mass of sliding snow that can bury people and places in its path.

**INQUIRY LABS AND ACTIVITIES**
- **Tracking an Outbreak**
  Find the source of a mysterious cholera outbreak. Use the same clues a detective uses.
- **Home Hazmat Survey**
  Find out which products in your home are classified as “hazardous materials” and why.
- **Testing for Lead**
  Use a lead-testing kit to find out whether common household items may contain lead.
Environmental Health

**Make Your Case**

The Central Case in this chapter explored the costs and benefits of using the pesticide DDT. In many African nations, governments use DDT to battle disease-carrying mosquitoes. Based on what you have learned, would you support continued use of DDT? Use information from the Central Case and the lesson to support your stand.

**Review Concepts and Terms**

1. What type of environmental hazard is shown below?

   ![Environmental Hazard Image]

   - a. social hazard
   - b. physical hazard
   - c. chemical hazard
   - d. biological hazard

2. The study of disease in human populations is

   - a. epidemiology
   - b. toxicology
   - c. a dose-response relationship
   - d. risk assessment

3. A person’s age, sex, weight, health issues, and genetic makeup influence how he or she responds to

   - a. risk assessment
   - b. natural disasters
   - c. antibiotic resistance
   - d. environmental hazards

4. Infectious diseases can be spread by

   - a. contaminated water
   - b. human contact
   - c. animals
   - d. all of the above

5. Chemicals that cause cancer are called

   - a. teratogens
   - b. carcinogens
   - c. neurotoxins
   - d. endocrine disruptors

6. A colorless, toxic, radioactive gas is

   - a. asbestos
   - b. radon
   - c. carbon monoxide
   - d. lead

7. In the United States, which agency takes the lead for responding to emerging diseases?

   - a. Centers for Disease Control and Prevention (CDC)
   - b. Environmental Protection Agency (EPA)
   - c. World Health Organization (WHO)
   - d. Federal Emergency Management Agency (FEMA)

8. The process through which pollutants get increasingly more concentrated at each step up the food chain is

   - a. biomagnification
   - b. anaphylaxis
   - c. toxicity
   - d. bioaccumulation

9. A large ocean wave often created by an ocean floor earthquake is a

   - a. avalanche
   - b. tornado
   - c. tsunami
   - d. mudslide

10. A powerful storm that forms over the ocean in the tropics is called a

    - a. earthquake
    - b. tornado
    - c. tsunami
    - d. hurricane

**Modified True/False**

Write true if the statement is true. If it is false, change the underlined word or words to make the statement true.

11. The relationship between different doses of chemicals and the responses they generate is called a risk assessment.

12. Infectious diseases are caused by a pathogen, such as a virus or a bacterium.

13. Chemicals that harm embryos and fetuses, thus causing birth defects, are known as pathogens.

14. Biomagnification begins when organisms begin to bioaccumulate pollutants in their tissues and cells.

15. A mass of snow sliding down a slope is a mudslide.
Reading Comprehension

Read the following selection and answer the questions that follow.

Mercury is a heavy metal. It occurs naturally in minerals and rocks. Throughout most of human history, natural sources released mercury into the air at a constant rate. More recently, however, human activity has accelerated the release of mercury.

Burning fossil fuels such as coal releases mercury into the air. Eventually, it ends up in soils or in surface water. Microbes in the water convert mercury into methylmercury. The mercury gets concentrated in the tissues of predatory fish such as shark and swordfish. Large fish typically concentrate more mercury than small fish.

People who eat fish with high methylmercury concentrations can suffer from muscle tremors, deafness, and poor concentration. Pregnant women and children are especially sensitive to its toxic effects. Learning disabilities and developmental delays are common in children who have been exposed to significant levels of methylmercury during development.

16. Based on the health effects described above, methylmercury would be best classified as a(n)

   a. carcinogen.
   b. endocrine disruptor.
   c. neurotoxin.
   d. allergen.

17. Concentrations of methylmercury are higher in large fish compared to concentrations in the water. This is best described as

   a. bioaccumulation.
   b. biomagnification.
   c. synergism.
   d. toxicology.

Short Answer

18. What sort of chemical hazard is thalidomide?
   19. What's the difference between a landslide and an avalanche?
   20. Do all social hazards result from an individual's lifestyle choice? Explain.
   21. Do all vectors, or disease-carrying organisms, suffer from the disease they carry?
   22. What sort of biological hazards spread through contaminated food and water or by direct human contact?
   23. Describe and give an example of an indoor chemical hazard and an outdoor chemical hazard.
   24. Explain the process of biomagnification.

Critical Thinking

25. **Apply Concepts** During flu season, there are constant reminders to wash your hands. Why is this important? Can you suggest something else people should do to prevent infection?

26. **Infer** What is the relationship between human population growth and the spread of diseases?

27. **Infer** Do you think it is possible that climate change contributes to environmental hazards? Explain.

28. **Explain** What are carcinogens and why are they difficult to identify?

29. **Apply Concepts** What happens when we build office buildings or schools with windows that are sealed and cannot be opened? What sort of chemical hazards build up?
Ecological Footprints

Read the information below. Copy the table into your notebook and record your calculations. Then, answer the questions that follow.

In 2001, the population of the United States was about 285 million (0.285 billion). The world’s population was about 6.1 billion. At the same time, annual pesticide use in the United States was around 1.20 billion pounds. World pesticide use was around 5.05 billion pounds. Finish filling in the table. Then, answer the questions.

1. What is your annual pesticide use?
2. What is the world average annual pesticide use per person?
3. What factors might contribute to this difference?

### Annual Pesticide Use

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Annual pesticide use (pounds of active ingredient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>You</td>
<td>1</td>
<td>4.21</td>
</tr>
<tr>
<td>Your class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your state</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World (total)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World (per capita)</td>
<td></td>
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</tr>
</tbody>
</table>

30. **Interpret Graphs** Describe the trend shown in this graph for the incidence of lung cancer and melanoma from 1984 to 2004.
31. **Infer** In what year did the rate of melanoma surpass the rate of lung cancer in men? In women?
32. **Predict** The data are only for a specific age group. If you were to look at similar data for the whole population, how do you think the graph would differ? Explain.

Write About It

33. **Creative Writing** What have you learned about environmental hazards, from this textbook and from your own experiences in life? Reflect on that question. Then, in response, write a poem, a rap song, a short story, or a personal account about environmental hazards.

34. **Persuasion** Write a short video script to convince others to protect environmental health. Keep your message brief and compelling.

35. **Apply the BIG QUESTION** Write a short summary that explains the relationship between environmental health and our own health.