

Chapter 2. Environmental Changes and Health

1. Briefly explain the air pollution episode that occurred in London in 1952.

A. It is one of the most widely known air pollution episode and was caused mainly by temperature inversion, resulting in 4,000 '*excess deaths*'.

2. What is air pollution? And what are its main sources?

A. Air pollution is the presence of substances in air at such concentrations, duration, and frequencies that it causes adverse effects on living organisms and the environment. The major sources of air pollution are: combustion of fossil fuels for electricity and transportation, various industrial processes, heating, and cooking.

3. What are the six principal air pollutants?

A. SO₂, NO₂, O₃, CO, particulate matter, and lead.

4. Briefly describe the relationship between developing economics and environmental problems.

A. The developing economies are facing various environmental problems such as air pollution, e.g. SO₂, O₃, CO, and particulate matter, causing premature deaths and reduced life expectancy; water pollution, lowering the quantity and quality of drinking water; and soil pollution affecting food quality.

5. What is "Minamata disease"?

A. The disease caused by mercury poisoning among residents of Minamata in Japan. The residents, most of them were fishermen and their family, consumed fish contaminated with highly toxic methyl mercury.

6. What does "Itai-itai-byo" or "ouch-ouch- disease" refer to?

A. The disease that the victims in Japan suffered as a result of consumption of rice contaminated with high levels of Cd.

7. Explain the water quality in New York City's Hudson River between the 1960s and the 2000s.

A. Around the middle of 1960s, Hudson River was found to be dying as a result of severe water pollution caused mainly by dumped raw sewage, paint, oil, and others. Much recovery of the river water has since been made, and today the river

produces more fish per acre than most other major estuaries of the North Atlantic.

8. Briefly explain the Love Canal episode.

A. It is one of the most widely known episodes related to disposal of hazardous wastes that occurred at Love Canal, an abandoned canal bed near Niagara Falls, New York. In the 1940s, Hooker Chemical & Plastics Corp. dumped 23,000 tons of chemical wastes into the Love Canal landfill. After the canal was filled and covered with earth, homes and school were built on the edge of the old canal. The area of covered chemicals became a playground. In 1977, black oily fluids containing chlorinated hydrocarbons oozed from the ground in the canal vicinity. Children attending the school showed unusual health problems such as skin rashes, chemical burns, and severe physiological and nervous disorders. Furthermore, an unusually high number of miscarriages and birth defects were noted.

9. What is the most pronounced change in disease pattern in the U.S. between the turn of the century and 1950?

A. Around 1950, pneumonia and tuberculosis were the two leading causes of deaths in the U.S. Because of the improved sanitation and public health measures, coupled with advancement in medical sciences and technology, tuberculosis and many other contagious diseases have largely been eradicated. Beginning about 1950, these illnesses have been replaced by chronic cardiovascular-respiratory diseases and malignant neoplasm or cancer.

10. Name the five leading causes of deaths in the U.S. that are considered environmentally related.

A. Heart diseases, cancer, chronic obstructive pulmonary diseases, chronic liver disease, and cirrhosis.

11. What is the recent trend in the incidence rate of children's cancer in the United States?

A. The cancer incidence rate among children in the U.S. has been increasing. (Although the reason for the increase is unclear, many experts suspect that it may be partly due to growing exposure to new chemicals in the environment.)

12. What does teratogenic mean?

A. It means being able to cause birth defects”.

13. Briefly explain how environmental chemicals may be associated with the reproductive system.

A. A variety of toxicants such as organochlorines, organobrominate, carbamates, pyrethroids, and some heavy metals such as Cd, Pb, and Hg have been implicated in reproductive abnormalities and impaired reproductive success in fish and wildlife populations throughout the world. Some pesticides may cause male sterility. Many of these chemicals appear to have the ability to cause ill effects by disrupting the body's normal hormonal system.

14. Explain the differences between the total cancer death rate and that of respiratory system cancer in the U.S. between 1950 and 2006.

A. Cancer death rates in the U.S. increased steadily until 1993 when the increase diminished. The death rates for all cancers increased steadily between 1950 and 2006. For example, using the death rate of all cancers in 1950 as 100%, the rate for 1970 is 112%; for 1990 is 114.5%; for 2006 is 116%, respectively. However, the death rate for respiratory system cancer increased much more dramatically during these periods. Again, using the death rate of 1950 as 100%, the rate for 1970 is 310%; for 1990, it is 660%; and for 2006, it is 680%, respectively.

15. What are the most prominent adverse effects of Pb poisoning?

A. It involves the nervous system, the hematopoietic system, and the kidneys.

16. What environmental problem exists in gold mining in the Amazon Basin?

A. The discovery of gold in Serra Pelada in the Amazon in 1970 touched off a great flow of migrants into that area in search of gold. There are potentially serious health effects from exposure to high levels of Hg during gold mining. Hg is used to bind the gold, and the resultant amalgam is heated at high temperatures to separate gold from the Hg. The vaporized Hg gradually accumulates in the aquatic food chain. Serious health effects exist because thousands of Hg sources occur in the Amazon region polluting the waters.

Chapter 3. Occurrence of Toxicants

1. What are the differences between acute and chronic injuries?

A. An acute effect refers to that manifested by severe injuries or even death of an organism, and is characterized by exposure to high concentrations of a