



Raven, Berg, Hassenzahl: Environment, 7th Edition
Chapter 22 Water Pollution

1. After coal is burned, what toxic chemical is often present in the resulting ash?
 - a) silicon dioxide
 - b) mercury
 - c) plutonium
 - d) aluminum oxide
 - e) iron oxide

Ans: b

Difficulty: Easy

Response:

Chapter Opener; 22.0

2. Which of the following led to a decrease in the size of the “dead zone” in the Gulf of Mexico?
 - a) increased biofuel production
 - b) increased global CO₂ emissions
 - c) Hurricane Dolly
 - d) proliferation of intensive agriculture
 - e) increased river discharge due to heavy rains

Ans: c

Difficulty: Easy

Response:

Laws the Protect Groundwater; 22.4.3

3. What potential health problems are likely to result from the release of Volatile Organic Compounds (VOC's) into the environment?
 - a) cancer
 - b) high blood pressure
 - c) neurological problems
 - d) hormonal effects
 - e) gastrointestinal disorders

Ans: d

Difficulty: Easy

Response:

Organic Compounds; 22.1.5



4. One major problem with sewage is that it adds which of the following to water?
- a) sodium chloride and dissolved oxygen
 - b) carbon dioxide and nitrogen
 - c) nitrogen and phosphorus
 - d) human wastes and heavy metals
 - e) soil and microorganisms

Ans: c

Difficulty: Easy

Response:

Sewage; 22.1.1

5. Sewage is degraded by the process of:
- a) cellular respiration
 - b) photosynthesis
 - c) enrichment
 - d) eutrophication
 - e) primary treatment

Ans: a

Difficulty: Easy

Response:

Sewage; 22.1.1

6. Escherichia coli:
- a) is a deadly virus found in sewage
 - b) is an infectious protozoan
 - c) is a good indicator of the amount of sewage in the water
 - d) cannot be transmitted through water
 - e) was responsible for a large outbreak of diarrhea in Milwaukee in 1993

Ans: c

Difficulty: Easy

Response:

Disease-Causing Agents; 22.1.2

7. Sediment pollution is caused by:
- a) erosion
 - b) disease-causing agents
 - c) fertilizers
 - d) toxic compounds
 - e) heated water

Ans: a

Difficulty: Easy

Response:

Sediment Pollution; 22.1.3



8. Turbidity:
- a) is caused by toxic chemicals
 - b) impairs the ability of producers to photosynthesize
 - c) is directly correlated with bacterial contamination
 - d) lowers the water temperature
 - e) increases light penetration

Ans: b

Difficulty: Easy

Response:

Sediment Pollution; 22.1.3

9. The "dead zone" in the Gulf of Mexico is:
- a) home to numerous bacteria and bottom dwellers, such as sea stars and spiny lobsters, but no fishes
 - b) due to regular dumping of untreated human sewage into the gulf
 - c) a large zone of hypoxia caused by excessive decomposition of algae
 - d) present year round
 - e) the largest oxygen-free zone identified to date

Ans: c

Difficulty: Easy

Response:

Inorganic Plant and Algal Nutrients; 22.1.4

10. Which of the following is an example of a synthetic organic compound found in polluted water?
- a) carbon dioxide
 - b) chloroform
 - c) chlorine
 - d) salt
 - e) heavy metals

Ans: b

Difficulty: Easy

Response:

Organic Compounds; 22.1.5



11. Inorganic chemicals:

- a) are contaminants that contain carbon in addition to other elements
- b) are easily degraded or broken down in the environment
- c) are found in groundwater and surface water
- d) may be toxic to aquatic organisms, but are safe for human consumption
- e) are produced by urban, rather than industrial, sources

Ans: c

Difficulty: Easy

Response:

Inorganic Chemicals; 22.1.6

12. Which of the following correctly identifies a source of possible lead poisoning for humans?

- a) food cans soldered with lead
- b) bioaccumulation of lead in albacore tuna
- c) prolonged exposure to fluorescent lights
- d) emissions from coal-burning
- e) bacterial agents transmitting lead particles

Ans: a

Difficulty: Easy

Response:

Inorganic Chemicals; 22.1.6

13. Mercury and lead:

- a) are parts of acid precipitation
- b) affect only small organisms
- c) do not cause serious problems in the United States
- d) cause mental impairment
- e) are radioactive

Ans: d

Difficulty: Easy

Response:

Inorganic Chemicals; 22.1.6



14. Mercury:

- a) does not occur naturally in the environment; it is a pollutant produced by exclusively human activities
- b) emissions are generated exclusively by municipal and medical waste incinerators
- c) emissions are linked to/produced by coal-fired power plants
- d) emissions are strictly regulated by the Clean Air Act
- e) cannot be removed from power plant emissions by the technology currently available

Ans: c

Difficulty: Easy

Response:

Inorganic Chemicals; 22.1.6

15. Radon:

- a) is produced by industry in large quantities
- b) is a component of acid precipitation
- c) causes mental impairment
- d) causes nutrient enrichment of water
- e) is radioactive

Ans: e

Difficulty: Easy

Response:

Radioactive Substances; 22.1.7

16. Thermal pollution:

- a) only impacts the respiration of fishes and other aquatic animals
- b) decreases the amount of dissolved oxygen
- c) has little effect on smaller aquatic organisms
- d) greatly increases turbidity
- e) is linked to agricultural run-off

Ans: b

Difficulty: Easy

Response:

Thermal Pollution; 22.1.8

17. Eutrophication:

- a) lessens biodiversity
- b) lowers the dissolved oxygen content of the water
- c) is caused by nutrient enrichment
- d) results in increased photosynthetic productivity
- e) all of these

Ans: e

Difficulty: Easy

Response:

Sewage; 22.1.1

18. Lakes with naturally occurring low levels of nutrients are called:

- a) hypoxic
- b) eutrophic
- c) enriched
- d) oligotrophic
- e) polluted

Ans: d

Difficulty: Easy

Response:

Sewage; 22.1.1

19. Pollution that is discharged into the environment through pipes, sewers, or ditches is called:

- a) polluted runoff
- b) point source pollution
- c) nonpoint source pollution
- d) specific discharge
- e) effluent runoff

Ans: b

Difficulty: Easy

Response:

Water Quality Today; 22.2



20. 72% of the water pollution in rivers is attributed to:

- a) industries
- b) household wastes
- c) agriculture
- d) mining
- e) logging

Ans: c

Difficulty: Easy

Response:

Water Pollution from Agriculture; 22.2.1

21. In a water treatment plant, chlorination:

- a) removes suspended particles
- b) uses aerobic microorganisms to decompose organic wastes
- c) removes phosphorus and nitrogen
- d) involves the anaerobic digestion of organic wastes
- e) kills disease-causing organisms

Ans: e

Difficulty: Easy

Response:

Purification of Drinking Water; 22.3.1

22. Fluoridation:

- a) helps to keep drinking water free of disease-causing organisms
- b) is more common in the western United States than on the east coast
- c) may eventually be replaced by ultraviolet disinfection or filtration through activated carbon granules
- d) is the main reason for the 80 to 90% decrease in tooth decay observed in children over the past few decades
- e) has not been linked to any serious medical conditions or side effects

Ans: e

Difficulty: Easy

Response:

Purification of Drinking Water; 22.3.1



23. Primary water treatment:

- a) uses aerobic microorganisms to decompose organic wastes
- b) removes suspended particles
- c) removes phosphorus and nitrogen
- d) involves the anaerobic digestion of organic wastes
- e) removes heavy metals and pesticides

Ans: b

Difficulty: Easy

Response:

Municipal Sewage Treatment; 22.3.2

24. Secondary water treatment:

- a) uses aerobic microorganisms to decompose organic wastes
- b) removes phosphorus and nitrogen
- c) involves the anaerobic digestion of organic wastes
- d) removes heavy metals and pesticides
- e) all of these

Ans: a

Difficulty: Easy

Response:

Municipal Sewage Treatment; 22.3.2

25. The Safe Drinking Water Act:

- a) was passed in 1965
- b) allowed states to set their own standards for drinking water
- c) required the EPA to determine the maximum contaminant levels for drinking water
- d) established the Environmental Protection Agency
- e) established national emission limitations for water pollutants

Ans: c

Difficulty: Easy

Response:

Safe Drinking Water Act; 22.4.1

26. A unique source of water pollution contributing to problems in the Ganges River is:
- a) raw sewage
 - b) disease-causing organisms
 - c) zebra mussels
 - d) PCBs
 - e) ash from human cremations

Ans: e

Difficulty: Easy

Response:

Water Pollution in Other Countries; 22.2.6

27. A fecal coliform test is a water-quality test for the presence of:
- a) disease causing bacteria
 - b) red blood cells in feces
 - c) the common intestinal bacterium *Escherichia coli*
 - d) Human Immunodeficiency virus
 - e) pathogenic organisms

Ans: c

Difficulty: Easy

Response:

Disease-Causing Agents; 22.1.2

28. All of the following represent a category of water pollution except:
- a) thermal pollution
 - b) organic compounds
 - c) disease-causing agents
 - d) sediment pollution
 - e) oligotrophic pollution

Ans: e

Difficulty: Medium

Response:

Types of Water Pollution; Entire Section; 22.1

29. All of the following conditions can be transmitted through contaminated food and water except:
- infectious hepatitis
 - AIDS
 - bacterial dysentery
 - cholera
 - typhoid

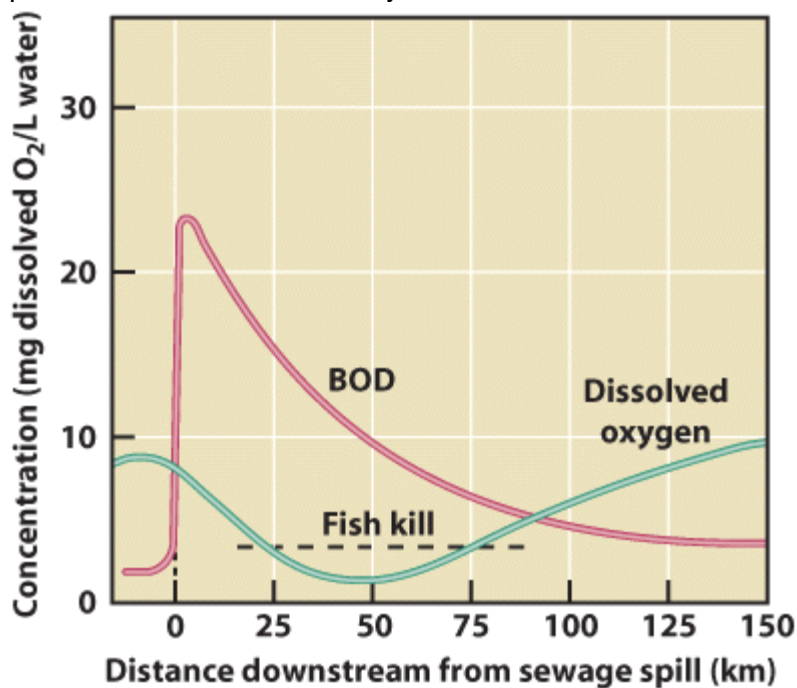
Ans: b

Difficulty: Medium

Response:

Disease-Causing Agents; 22.1.2

30. Given the data in the graph below, at what approximate distance downstream from the spill will a fish kill be most likely?



- 0 km
- 5 km
- 30 km
- 90 km
- 120 km

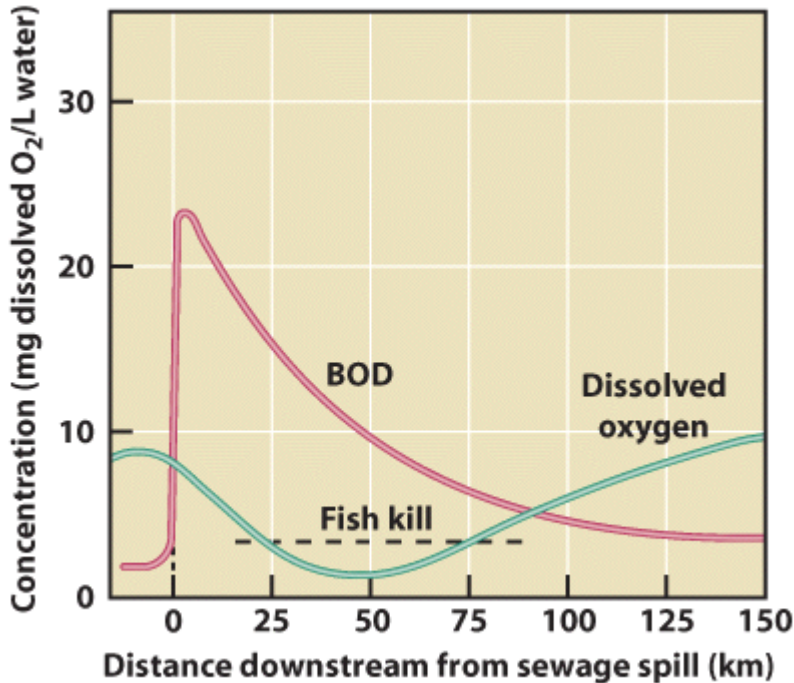
Ans: c

Difficulty: Medium

Response:

Sewage; 22.1.1

31. Given the data in the graph, at what approximate distance downstream from the spill does the dissolved oxygen level recover to its original, pre-spill level?



- a) 15 km
- b) 30 km
- c) 60 km
- d) 90 km
- e) 120 km

Ans: e

Difficulty: Medium

Response:

Sewage; 22.1.1

32. Which of the following is not a potential solution to the "dead zone" in the Gulf of Mexico?
- a) further treating wastewater to remove phosphorus and nitrogen
 - b) restoring the wetlands in the Mississippi River
 - c) reducing the amount of fertilizer used along the Mississippi River watershed
 - d) reducing nitrogen oxides from automobile emissions
 - e) limit agriculture, both crops and livestock, along the Mississippi River

Ans: e

Difficulty: Medium

Response:

Inorganic Plant and Algal Nutrients; 22.1.4

33. Which statement is not true about organic compounds?
- a) they contain carbon
 - b) they can be pesticides, solvents, or plastics
 - c) they come from industries, homes, and farms
 - d) the human body makes some organic compounds
 - e) none of these, all are true statements about organic compounds

Ans: e

Difficulty: Medium

Response:

Organic Compounds; 22.1.5

34. Which of the following statements about mercury is false?
- a) Methyl mercury compounds are unusual in that they cannot cross the body's blood-brain barrier.
 - b) Significant amounts of mercury are released into the environment during the smelting of other metals.
 - c) Human exposure to mercury is primarily by eating marine animals containing high levels of mercury.
 - d) Methyl mercury compounds are more toxic forms of mercury that readily enter the food web.
 - e) Methyl mercury compounds persist in the environment for a long time.

Ans: a

Difficulty: Medium

Response:

Types of Water Pollution; Inorganic Chemicals; 22.1.4

35. Which of the following is not an example of nonpoint source pollution?
- a) agricultural runoff
 - b) erosion from logging operations
 - c) acid mine drainage
 - d) sewage treatment plant effluent
 - e) construction sediment

Ans: d

Difficulty: Medium

Response:

Water Quality Today; 22.2

36. Which of the following nonpoint source pollutants is incorrectly matched with an effect?
- a) soil erosion from fields — sediment pollution
 - b) animal waste — water enrichment
 - c) plant residues — low BOD
 - d) fertilizer runoff — water enrichment
 - e) chemical pesticides — health issues for aquatic organisms

Ans: c

Difficulty: Medium

Response:

Water Quality Today; 22.2

37. Groundwater can be contaminated from all of the following sources except:
- a) backyards
 - b) municipal sanitary landfills
 - c) intensively cultivated agricultural lands
 - d) underground petroleum storage tanks
 - e) none of these, all are potential sources of groundwater contamination

Ans: e

Difficulty: Medium

Response:

Groundwater Pollution; 22.2.5

38. All of the following can be used to dispose of the sludge formed during wastewater treatment except:
- a) application to soil as a fertilizer
 - b) incineration
 - c) ocean dumping
 - d) anaerobic digestion
 - e) filtration through activated carbon granules

Ans: e

Difficulty: Medium

Response:

Municipal Sewage Treatment; 22.3.2

39. Which of the following associations correctly identifies a group at high risk from lead poisoning and the group's associated health problem?
- a) middle-aged men and hypertension
 - b) middle-aged women and weight gain
 - c) pregnant women and partial hearing loss
 - d) children and blindness
 - e) dogs and parasitic heart worms

Ans: a

Difficulty: Medium

Response:

Inorganic Chemicals; 22.1.6

40. Which of the following associations correctly pairs the current law with its goal controlling water pollution?
- a) Refuse Act (1899) - eliminates the discharge of pollutants into sanitary landfills
 - b) Clean Water Act (1987) – sets the amount of tax to charge polluters to pay for the cleanup
 - c) Safe Drinking Water Act (1974) – sets uniform federal standards for public drinking water supplies
 - d) Great Lakes Toxic Substance Control Agreement (1960) - regulates underground injection of wastes
 - e) all of these are correctly paired

Ans: c

Difficulty: Medium

Response:

Safe Drinking Water Act; 22.4.1

41. A large amount of sewage:
- a) generates a high BOD, which raises the level of dissolved oxygen in the water
 - b) generates a high BOD, which lowers the level of dissolved oxygen in the water
 - c) generates a low BOD, which raises the level of dissolved oxygen in the water
 - d) generates a low BOD, which lowers the level of dissolved oxygen in the water
 - e) does not affect the BOD

Ans: b

Difficulty: Medium

Response:

Sewage; 22.1.1

42. What is the difference between an oligotrophic lake and a eutrophic lake?
- a) an oligotrophic lake is enriched; a eutrophic lake is unriched
 - b) oligotrophic lakes are found only in northern latitudes; eutrophic lakes are found only in southern latitudes
 - c) an oligotrophic lake is defined as less than 40 meters deep; a eutrophic lake is defined as over 40 meters deep
 - d) an oligotrophic lake has a low level of nutrients; a eutrophic lake has a high level of nutrients
 - e) an oligotrophic lake has a high level of nutrients; a eutrophic lake has a low level of nutrients

Ans: d

Difficulty: Medium

Response:

Sewage

43. Coastal hypoxia can be reversed through:
- a) eliminating the use of pesticides
 - b) building dams to create reservoirs
 - c) controlling the mercury emission from power plants
 - d) regulating the disposal of medical wastes
 - e) restoring former wetlands in the watershed to reduce the nitrate and phosphate load from fertilizers

Ans: e

Difficulty: Medium

Response:

Inorganic Plant and Algal Nutrients; 22.1.4

44. You can make a difference preventing water pollution. Which of the following is a true "DO" or "DON'T" statement for preventing water pollution?
- a) DO: run the tap while brushing teeth
 - b) DON'T: substitute less hazardous household cleaning chemicals
 - c) DO: make sure pesticides are used indoors and outdoors
 - d) DON'T: pour used motor oil or antifreeze down storm drains or on the ground
 - e) DO: replace trees, shrubs and ground cover with grass lawn (turf)

Ans: d

Difficulty: Medium

Response:

Municipal Water Pollution; 22.2.2

45. Put the following events of septic system operation in the correct order of occurrence:
- I. Household sewage is piped into septic tank.
 - II. Wastewater containing suspended material flows into drain field.
 - III. Purified wastewater percolates into groundwater or evaporates from soil.
 - IV. Bacteria decompose organic material in well-aerated soil.
 - V. Heavy particles settle out of water and bacteria decompose grease and oil.
- a) I – II – III – IV - V
 - b) I – V – II – IV - III
 - c) I – IV – III – V - II
 - d) I – III – V – II - IV
 - e) I – IV – III – II - V

Ans: b

Difficulty: Medium

Response:

Individual Septic Systems; 22.3.3

46. Wastewater, including sewage, usually undergoes several treatments at a sewage treatment plant. Match the treatment with the process for expected outcome.
- a) primary treatment: eliminating inorganic and organic compounds by aerating and circulating the wastewater.
 - b) tertiary treatment: biologically decomposing suspended organic material.
 - c) secondary treatment: reducing phosphorus and nitrogen levels with a filtering system.
 - d) primary treatment: removing suspended and floating particles by mechanical processes.
 - e) tertiary treatment: evaporation of wastewater to concentrate sludge.

Ans: d

Difficulty: Medium

Response:

Improving Water Quality; Municipal Sewage Treatment; 22.3.2

47. Which of the following is a basic goal of the Clean Water Act?
- a) to eliminate the discharge of pollutants
 - b) to attain water quality levels that are safe for fishing and swimming
 - c) to punish heavy waterway polluters
 - d) both to eliminate the discharge of pollutants and to attain water quality levels that are safe for fishing and swimming
 - e) set uniform federal standards for drinking water

Ans: d

Difficulty: Easy

Response:

Laws Controlling Water Pollution; Clean Water Act; 22.4.2

48. Which of the following defines the maximum amount of water pollutant that can be discharged from a certain source?
- a) national emission limitations
 - b) maximum contaminant level
 - c) artificial contaminant governance
 - d) discharge regulation standards
 - e) none of these

Ans: a

Difficulty: Easy

Response:

Laws Controlling Water Pollution; Clean Water Act; 22.4.2

49. Which of the following organizations is dedicated to protecting bodies of water and enforcing water pollution laws in the U.S.?
- a) The Sierra Club
 - b) Hippies
 - c) Water Keeper Alliance
 - d) United Citizen Watchdogs
 - e) Clean Water Coalition

Ans: c

Difficulty: Easy

Response:

Meeting the Challenge; Using Citizen Watchdogs to Monitor Water Pollution

50. Which of the following is a synthetic organic compound found in polluted water?
- a) pesticides
 - b) industrial chemicals
 - c) plastics
 - d) solvents
 - e) all of these

Ans: e

Difficulty: Easy

Response:

Types of Water Pollution; Organic Compounds; 22.1.5

51. Which of the following is not an inorganic chemical found in polluted water?

- a) acids
- b) salts
- c) heavy metals
- d) antibiotics
- e) none of these

Ans: d

Difficulty: Easy

Response:

Types of Water Pollution; Inorganic Chemicals; 22.1.6

52. Which of the following heavy metals contaminates water and can accumulate in human muscle tissue?

- a) lead
- b) aluminum
- c) mercury
- d) iron
- e) both lead and mercury

Ans: c

Difficulty: Medium

Response:

Types of Water Pollution; Inorganic Chemicals; 22.1.6

53. Which of the following occurs in sewage treatment plants when excessive rainfall causes sewage water to flow into waterways without being treated?

- a) combined sewer overflow
- b) isolated sewer overflow
- c) point source pollution
- d) industrial wastewater
- e) none of these

Ans: a

Difficulty: Medium

Response:

Water Pollution; 22.2.2

54. Which of the following industries contributes to a high BOD?

- a) food processing
- b) nuclear power
- c) agriculture
- d) pulp and paper mills
- e) both food processing and pulp and paper mills

Ans: e

Difficulty: Medium

Response:

Industrial Wastes in Water; 22.2.3

55. Which of the following is not a true statement about medicines polluting the water?

- a) medicines pass through wastewater treatment systems without being altered and removed
- b) the chemicals in medicines occur in smaller amounts compared to other pollutants
- c) they can be easily removed
- d) synthetic molecules can be hard to break down
- e) environmental impacts can be substantial even at low concentrations

Ans: c

Difficulty: Medium

Response:

Case in Point: 'Green Chemistry'; 22.2.4

56. Which of the following statements about groundwater pollution is true?

- a) the most common pollutants come from nuclear power plants
- b) low nitrate levels in drinking water become a concern in rural areas
- c) municipal systems are very concerned with the nitrate levels in drinking water
- d) nitrates contaminate shallow groundwater
- e) none of these are true

Ans: d

Difficulty: Medium

Response:

Types of Water Pollution; 22.1