

Chapter 1 & 2 Review Questions + Problem Set

Directions- On loose-leaf paper, answer the following questions in well-written complete sentences. You do not need to write the question. Number each answer so the number corresponds the question that you have answered. **Only hand-written responses will be accepted. Typed or emailed copies will not be graded.**

Chapter 1 Review Questions

1. What are the three principles of sustainability?
2. Define natural capital, natural resources, and natural services.
3. Define nutrient cycling and explain why it is important?
4. What is environmental degradation?
5. Distinguish between a perpetual resource and a renewable resource and give an example of each.
6. What is sustainable yield?
7. Define and give two example of a nonrenewable resource.
8. What is economic growth? Distinguish between gross domestic product (GDP) and per capita GDP.
9. Distinguish between more-developed countries and less-developed countries.
10. Define and give three examples of environmental degradation (natural capital degradation).
11. What is pollution?
12. Distinguish between point source and nonpoint sources of pollution.
13. Distinguish between pollution cleanup (output pollution control) and pollution prevention (input pollution control) and give an example of each.
14. What is the tragedy of the commons?
15. What is an ecological footprint? What is a per capita ecological footprint?
16. What is the IPAT model for estimating our environmental impact?
17. Identify four basic causes of the environmental problems that we face today.
18. Describe the past, current, and projected exponential growth of the world's human population.
19. What is affluence?
20. What is poverty and what are three of its harmful environmental and health effects?
21. Describe the connection between poverty and population growth.
22. Explain how excluding from the prices of goods and services the harmful environmental costs of producing them affects the environmental problems we face.
23. What is the connection between government subsidies, resource use, and environmental degradation?
24. Distinguish among the planetary management, stewardship, and environmental wisdom worldviews

Chapter 2 Review Questions

25. Describe the steps involved in the scientific process.
26. Distinguish between an element and a compound and give an example of each.
27. Define acidity and describe the pH scale?
28. Distinguish between a physical change and a chemical change (chemical reaction) and give an example of each.
29. What is the law of conservation of matter and why is it important?
30. What is energy?
31. Distinguish between kinetic energy and potential energy and give an example of each.
32. What is heat?
33. Define and give two examples of electromagnetic radiation.
34. What are fossil fuels and what three fossil fuels do we use most to supplement energy from the sun?
35. What is the first law of thermodynamics (law of conservation of energy) and why is it important?
36. What is the second law of thermodynamics and why is it important?
37. Distinguish among the input, flow (throughput), and output of a system.
38. What is a feedback loop? Distinguish between a positive feedback loop and a negative (corrective) feedback loop in a system, and give an example of each.
39. Distinguish between a time delay and a synergistic interaction (synergy) in a system; give an example of each.
40. What is a tipping point?

Chapter 1 Problem Set

On loose-leaf paper, using the format modeled by your instructor, solve the following problems.

SHOW ALL OF YOUR WORK. MAKE IT LOOK BEAUTIFUL ☺

Complete the following conversions

1. 785.3 kilometers (km) to meters (m).
2. 68.2 milligrams (mg) to grams (g).
3. 8.26 kiloliters (kL) to milliliters (mL).
4. 0.0025 to scientific notation.
5. 9,790,000 to scientific notation.
6. 4.5×10^7 to standard notation.
7. 1.2×10^{-4} to standard notation.

Complete the following calculations without a calculator & show all of your steps

8. $2.7 \times 10^5 (0.5) =$
9. $7.5 \times 10^8 (2.0 \times 10^3) =$
10. $0.09 \div 0.27 =$
11. $8.1 \times 10^5 \div 1.35 \times 10^5 =$

Complete the following dimensional analysis problems without a calculator. Include all units, cancel units, show all multiplication and division calculations, and record your answer to the nearest tenths.

12. 120 ounces to kilograms
13. 17 gallons to liters

Complete the following word problems without a calculator. Use dimensional analysis, include all units, cancel units, show all multiplication and division calculations, and record your answer to the nearest tenths or hundredths.

14. In 2006 the United States consumed 140.3 billion gallons of gasoline as motor fuel. The combustion of 1 gallon of gasoline produces 8.750 kg of CO₂. What were the total annual CO₂ emissions for United States motor fuel consumption in 2006? If the population at the time was 300 million, what was the per capita generation of auto CO₂ emissions for 2006?
15. In 2011 the United States consumed 18,840,000 barrels per day (bbl/day) of refined petroleum products. What was the average per capita consumption of refined petroleum products in gallons per day? (2011 U.S. population = 3.0×10^8 & 1 barrel of oil = 42 US gallons)
16. The combustion of one gallon of gasoline produces about 8.750 kg of CO₂. Two cars are making a trip of 600 miles. The first car's average fuel economy is 20 miles per gallon, and the second gets 30 miles per gallon. How much less CO₂ will be the second car produce on this trip?

Chapter 2 Problem Set

17. Study Table 2-1 *Chemical Elements Used in This Book* on page 38.
18. Study Table 2-2 *Chemical Ions Used in This Book* on page 40.
19. Study Table 2-3 *Compounds Used in This Book* on page 40

Balance the following chemical equations and explain why each is relevant to environmental science.

20. $\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O}$
21. $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
22. $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Heat}$
23. $\text{S} + \text{O}_2 \rightarrow \text{SO}_3$