

Chapter 2 Review Questions: Science, Matter, Energy and Systems

1. Describe conclusions of the controlled scientific experiment carried out at the Hubbard Brook Experimental Forest.
2. Distinguish among a scientific hypothesis, scientific theory, and scientific law (law of nature).
3. What is peer review and why is it important?
4. Explain why scientific theories are not to be taken lightly and why people often use the term “theory” incorrectly.
5. Describe how a hypothesis about the decline of a civilization on Easter Island has been challenged by new data.
6. Explain why scientific theories and laws are the most important and most certain results of science.
7. What is statistics?
8. What is probability and what is its role in scientific conclusions and proof?
9. What are three limitations of science and environmental science?
10. Distinguish among atoms, molecules, and ions and give an example of each.
11. Distinguish among protons, neutrons, and electrons. What is the nucleus of an atom?
12. Distinguish between the atomic number and the mass number of an element. What is an isotope?
13. What is pH?
14. Distinguish between organic compounds and inorganic compounds and give an example of each.
15. What is a cell?
16. Distinguish among a gene, a trait, and a chromosome.
17. What is matter quality? Distinguish between high- quality matter and low- quality matter and give an example of each.
18. Distinguish between a physical change and a chemical change (chemical reaction) and give an example of each.
19. What is a nuclear change?
20. Explain the differences among natural radioactive decay, nuclear fission, and nuclear fusion.
21. What is the law of conservation of matter and why is it important?
22. What is energy? Distinguish between kinetic energy and potential energy and give an example of each.
23. What is heat?
24. Define and give two examples of electromagnetic radiation.
25. What are fossil fuels and what three fossil fuels do we use most to supplement energy from the sun?
26. What is energy quality? Distinguish between high- quality energy and low- quality energy and give an example of each.
27. What is the first law of thermodynamics (law of conservation of energy) and why is it important?

28. What is the second law of thermodynamics and why is it important? Explain why the second law means that we can never recycle or reuse high- quality energy.
29. Define and give an example of a system.
30. What is feed-back? 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.
31. Distinguish between a time delay and a synergistic interaction (synergy) in a system and give an example of each.
32. What is a tipping point?