

CHAPTER 2—SCIENCE, MATTER, ENERGY, AND SYSTEMS

TRUE/FALSE

1. Scientists tend to be highly skeptical of new data, hypotheses, and models until they can be tested and verified.
2. Deductive reasoning goes from the specific to the general, e.g., from the "bottom up."
3. When someone says that evolution is not important, "after all, it's just a theory," it is probable that they do not understand how scientists use the term "theory."
4. Tentative or frontier science is always science done by incompetent scientists whose work will never be accepted by their peers.
5. Scientists can disprove things but they cannot prove anything absolutely, which means there is always some uncertainty in science.
6. Scientists use the statistical concept of probability to evaluate the results of experimentation.
7. Atoms have a net positive electrical charge.
8. A chemical formula is a shorthand way of writing the symbols for atoms or ions in a compound.
9. Methane, a hydrocarbon, is considered an organic molecule even though it contains only one carbon atom.
10. How useful matter is to humans as a resource is determined by its concentration, availability for use, and its potential.
11. In a nuclear fission reaction atoms are destroyed.
12. A nuclear change in which two isotopes of light elements are forced together, releasing huge amounts of energy, is called nuclear fission.
13. In a chemical reaction, there is a change in the arrangement of atoms, ions, or molecules of the substances involved
14. According to the law of conservation of matter, once trash decomposes in a landfill we have completely gotten rid of the matter which made up the trash.
15. Energy consumption does not mean the disappearance of energy; rather it is the conversion of energy from one form to another with no net loss.
16. Energy cannot be recycled.
17. Burning coal demonstrates the conversion of energy from kinetic to potential.
18. The scientific principles of sustainability show that everything we do affects someone or something in the environment in some way.

19. A negative feedback loop causes a system to further change in the same direction.
20. A very useful tool in studying living systems is the use of computer models or simulations.

COMPLETION

1. Science is based on the assumption that events in the natural world follow _____ patterns that can be understood.
2. _____ happens when scientists report details of their research and other scientists evaluate it.
3. Watching a variety of objects fall to earth, we can use _____ reasoning to propose that all objects fall to the earth's surface when dropped.
4. A(n) _____ occurs when an accepted theory or law of science is changed as a result of new discoveries or ideas.
5. A molecule is a combination of two or more atoms held together by forces called _____.
6. Compounds are combinations of two or more different elements held together in _____ proportions.
7. A(n) _____ has more hydrogen ions than hydroxide ions and has a pH _____ 7.
8. An organic compound is one that contains one or more _____ atoms combined with atoms of one or more other elements.
9. If a macromolecule was a brick wall it would be called a(n) _____ made up of repeating units called _____.
10. Thousands of genes make up a single _____, a double helix DNA molecule wrapped around proteins.
11. _____ are segments of DNA on chromosomes that contain instructions to make proteins.
12. Matter quality is a measure of how useful a form of matter is to humans as a resource and is based on its _____ and _____ in a given area or volume.

13. According to the _____, when a physical or chemical change occurs, no atoms are created or destroyed.
14. Body fat of a human or other animal is a type of _____ energy.
15. Most of the energy from burning a gallon of gasoline is lost as _____ energy called heat.
16. Scientists estimate that only _____% of the energy used in the U.S. ends up performing useful work.
17. A(n) _____ occurs when an output of matter, energy, or information is fed back into the system as an input and leads to changes in the system.
18. There are many types of electromagnetic radiation, each with a different _____ and energy content.
19. A _____ is a set of components that function and interact in some regular way.
20. Any process that increases or decreases a change to a system is called _____.