

Chapter **13** Science, Technology, and Society

Introduction

Chapter 13 focuses on the relationships of **science**, **technology**, and **society**. The relationship of science and technology is discussed with an emphasis on how science and technology advance each other. Technology as a system is defined and how technology affects us and the environment in both a beneficial and harmful way.

Society and its relationship to science and technology are discussed. Science and technology affect society and society affects science and technology. Examples of each of these relationships are presented. Historical, political, and social factors affect science and a major example of each is outlined. Nuclear power plant disasters, acid rain, and possibly global warming are global effects caused by technology.

Technology provides humans with increased choices in decision making. Decisions regarding using technology processes and products must consider long-term and short-term consequences. If the harmful consequences outweigh the benefits the technology should be eliminated.

Students Should Understand the Following Concepts

- Science is the process of learning about the natural world.
- Technology is the application of science knowledge to produce products and processes to help solve problems and meet individual and societal needs.
- Humans interact with technology in almost everything we do.
- Technology helps to improve or extend human abilities. The use of technology can have both beneficial and harmful effects on the environment.

- Society, technology, and science are involved in a dynamic relationship where each one affects the others.
- There are positive and negative considerations associated with using technology. The short-term and long-term effects of technology need to be considered when we use any technology.

Activities to Develop the Topic

Use one or more of the following activities to help review this unit with your students.

To provide students with an appreciation of how far technologically we have come, let each student create a technological timeline. Have students select a technology area (medicine, energy, transportation, television, radio, telephone, Internet etc.) and research its advances during the last 200 years (See Table 13-2 in the text.). After students complete their timeline, have each make a brief report and then conduct a quick vote to see what the class thinks is the most important technological advance.

After reviewing how technology has shaped society in the past, have the students focus on where technology will take society in the future. One example is: ask students to imagine what would happen if the United States government determined that due to decreasing voter turnout citizens would be able to vote online. Ask students what needs to be done to ensure that this plan will work. Have them design safeguards, and troubleshoot possible problems with this plan.

Do this activity to show that any technology can have both beneficial and harmful affects. List any technology (i.e., telephone, seat belts, automobiles, television, etc.) on the board and under it set up two columns—beneficial effects and harmful effects. Ask students to contribute to either column. After a few minutes discuss long-term and short-term affects and ask students if we should continue to use this technology.

Name _____

Date _____

Class _____

Review of Chapter 13

1. The term that describes the process of asking questions and seeking knowledge about our natural world is
 - (1) technology
 - (2) science
 - (3) evolution
 - (4) conservation
2. Which question is best answered by technology?
 - (1) What killed the dinosaurs?
 - (2) How can we get energy from the atom?
 - (3) How did the moon form?
 - (4) Why are the glaciers melting?
3. Which statement describes a technological process?
 - (1) using polio vaccine to prevent polio
 - (2) passing of laws mandating inspection of food preparation areas
 - (3) photosynthesis in plants
 - (4) sterilization of surgical equipment to prevent infection
4. The scientific principle that led to the development of air conditioning is
 - (1) an expanding gas cools
 - (2) water freezes at 0°C
 - (3) evaporation is a cooling process
 - (4) moving water heats the air
5. A group of related parts that work together for a common purpose is called a system. In which situation is a system used?
 - (1) operating a car
 - (2) playing baseball
 - (3) planting a tree
 - (4) using a computer
6. Which technological device's main purpose is to extend scientific knowledge?
 - (1) television
 - (2) computer
 - (3) space probe
 - (4) automobile
7. The feedback component in a home air conditioning system is the
 - (1) fan
 - (2) furnace
 - (3) refrigerator
 - (4) thermostat

8. Which example best illustrates technology being used to change the environment?
- (1) computer system
 - (2) home music system
 - (3) air conditioning in a home
 - (4) electric stove
9. At one time, grass was cut with a mechanical device that was pushed by hand. Today, lawn mowing machines operate with a gasoline engine or electric motor. In this case the mechanical grass cutting device is considered a(n)
- (1) outdated technology
 - (2) technological process
 - (3) new technology
 - (4) system
10. The development of new technologies is influenced by
- (1) society
 - (2) science
 - (3) both science and society
 - (4) neither science nor society
11. Which is an example of a job created by technology within the last 25 years?
- (1) airplane pilot
 - (2) telephone operator
 - (3) computer programmer
 - (4) bank teller
12. Which is an example of how science affects technology?
- (1) discovering new race car fuels
 - (2) constructing longer-lasting race car tires
 - (3) building safer race car tracks
 - (4) building faster race cars
13. Technology has affected the number of people needed to perform some jobs in the United States. In recent years, which job has the number of workers been reduced the most because of technology?
- (1) teachers
 - (2) farmers
 - (3) police officers
 - (4) doctors
14. Which question represents a problem that technology may attempt to answer?
- (1) How did the universe form?
 - (2) How can cars get better gas mileage?
 - (3) How does a green plant perform photosynthesis?
 - (4) Is there any form of life on Mars?
15. A hundred years ago, large holes were dug using picks and shovels. Today, large holes are dug using backhoes and bulldozers. This is an example of
- (1) technology eliminating jobs
 - (2) technology creating new job
 - (3) technology having no effect on construction
 - (4) technology modifying jobs

16. An example of a scientific discovery that has led to pots being made from metal substances is
- (1) metal is a good conductor of heat
 - (2) metal is a good convector of heat
 - (3) metal is a good radiator of heat
 - (4) metal is a good producer of heat
17. Genetic engineering of crops is an example of a(n)
- (1) modification of an old technology
 - (2) old technology
 - (3) new technology
 - (4) elimination of a technology
18. Global warming is possibly being caused by humans burning fossil fuels and adding excessive carbon dioxide into the atmosphere. People are looking toward what area(s) for a solution to this problem?
- (1) only technology
 - (2) only society
 - (3) only science
 - (4) technology, science, and society
19. Acid rain is upsetting the ecology of lakes and streams in the Adirondack Mountains. This is a burden on society associated with
- (1) burning fossil fuels
 - (2) chemical fertilizers
 - (3) ozone
 - (4) sewage waste
20. An example of a long-term benefit outweighing a short-term burden is
- (1) cutting down trees to produce paper
 - (2) placing garbage in landfills
 - (3) using sunscreen lotion to prevent skin cancer
 - (4) building faster cars