

## Ch. 2; Physical Science

### Multiple Choice

*Identify the choice that best completes the statement or answers the question.*

- \_\_\_\_\_ 1. Table sugar and table salt are examples of
  - a. atoms.
  - b. elements.
  - c. mixtures.
  - d. pure substances.
- \_\_\_\_\_ 2. Anything that has mass and takes up space is called
  - a. matter.
  - b. energy.
  - c. heterogeneous.
  - d. homogeneous.
- \_\_\_\_\_ 3. If you heat a liquid and measure the temperature at which it boils, you are measuring a(n)
  - a. atomic property.
  - b. physical property.
  - c. chemical property.
  - d. molecular property.
- \_\_\_\_\_ 4. If you describe methane as a gas that easily catches fire, you are describing a
  - a. state of matter.
  - b. physical property.
  - c. chemical property.
  - d. chemical formula.
- \_\_\_\_\_ 5. Substances that CANNOT be broken down chemically into other substances are
  - a. elements.
  - b. compounds.
  - c. mixtures.
  - d. solutions.
- \_\_\_\_\_ 6. All elements are composed of extremely small particles called
  - a. compounds.
  - b. mixtures.
  - c. atoms.
  - d. molecules.
- \_\_\_\_\_ 7. Which of these statements is false?
  - a. Oxygen and copper are examples of elements.
  - b. Elements are pure substances.
  - c. Atoms of different elements can combine to form compounds.
  - d. Atoms of different elements are the same.
- \_\_\_\_\_ 8. What holds atoms together in a molecule?
  - a. density
  - b. gravity
  - c. physical bonds

- d. chemical bonds
- \_\_\_\_\_ 9.  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ , and  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$  are all examples of chemical
- properties.
  - changes.
  - bonds.
  - formulas.
- \_\_\_\_\_ 10. Lemonade consists of several substances that are NOT chemically combined, so lemonade is classified as a(n)
- element.
  - compound.
  - mixture.
  - pure substance.
- \_\_\_\_\_ 11. Soil, a salad, and sugar water are all examples of
- elements.
  - compounds.
  - mixtures.
  - atoms.
- \_\_\_\_\_ 12. One example of a physical change is
- burning paper.
  - baking cookies.
  - heating table sugar.
  - dissolving salt in water.
- \_\_\_\_\_ 13. How do liquid water, ice, and water vapor differ from each other?
- They are different states of matter.
  - They are different compounds.
  - They are made of different kinds of molecules.
  - They are made of different kinds of atoms.
- \_\_\_\_\_ 14. One example of a chemical change is
- filtering.
  - burning wood.
  - boiling water.
  - crushing a can.
- \_\_\_\_\_ 15. Which of the following is NOT an example of a chemical change?
- gas burning on a stove
  - rust forming on an iron fence
  - salt dissolving in a glass of water
  - using electricity to break down water into hydrogen and oxygen
- \_\_\_\_\_ 16. The form of energy stored in the bonds between atoms is called
- thermal energy.
  - electrical energy.
  - chemical energy.
  - electromagnetic energy.
- \_\_\_\_\_ 17. Radio waves, visible light from the sun, infrared “rays” from heat lamps, the waves that heat food in a microwave oven, ultraviolet rays, and X-rays are all considered types of
- electrical energy.

- b. electromagnetic energy.
  - c. chemical energy.
  - d. thermal energy.
- \_\_\_\_\_ 18. What characteristics listed below do photosynthesis and combustion NOT share?
- a. Both involve chemical change.
  - b. Both are endothermic.
  - c. Both change energy from one form to another.
  - d. Both cause changes in matter.
- \_\_\_\_\_ 19. During photosynthesis, plants transform electromagnetic energy from the sun into
- a. electrical energy.
  - b. exothermic energy.
  - c. chemical energy.
  - d. thermal energy.
- \_\_\_\_\_ 20. The ability to do work or cause change describes
- a. density.
  - b. energy.
  - c. matter.
  - d. temperature.
- \_\_\_\_\_ 21. The change in which ice absorbs energy and melts is a(n)
- a. endothermic change.
  - b. exothermic change.
  - c. chemical change.
  - d. change in mass.
- \_\_\_\_\_ 22. Fireworks exploding in the sky and giving off light are an example of a(n)
- a. endothermic change.
  - b. exothermic change.
  - c. physical change.
  - d. change in mass.
- \_\_\_\_\_ 23. Which of the following is NOT an example of a physical change?
- a. gasoline burning in a car's engine
  - b. salt dissolving in a glass of water
  - c. crushing aluminum soda cans
  - d. water boiling in a pot
- \_\_\_\_\_ 24. Which of the following is NOT a pure substance?
- a. table salt
  - b. chocolate chip cookie dough
  - c. ice
  - d. iron
- \_\_\_\_\_ 25. A characteristic of a pure substance that describes its ability to change into different substances is called a
- a. state of matter.
  - b. chemical bond.
  - c. chemical property.
  - d. physical property.
- \_\_\_\_\_ 26. Which of the following is an example of a homogeneous mixture?

- a. chicken soup
- b. salad
- c. soil
- d. air

- \_\_\_\_\_ 27. Which of the following statements about mixtures is true?
- a. Mixtures are usually easy to separate into their components.
  - b. The properties of a substance change when it is added to a mixture.
  - c. The parts of a mixture are combined in a set ratio.
  - d. Mixtures are considered to be pure substances.
- \_\_\_\_\_ 28. Table sugar is an example of a(n)
- a. element.
  - b. compound.
  - c. mixture.
  - d. solution.
- \_\_\_\_\_ 29. When matter changes, the most common form of energy released or absorbed is
- a. electrical energy.
  - b. electromagnetic energy.
  - c. thermal energy.
  - d. chemical energy.
- \_\_\_\_\_ 30. Thermal energy always moves from
- a. solids to liquids.
  - b. liquids to gases.
  - c. cooler matter to warmer matter.
  - d. warmer matter to cooler matter.

### Modified True/False

*Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.*

- \_\_\_\_\_ 31. A(n) pure substance is made of only one kind of matter and has definite properties.  
\_\_\_\_\_
- \_\_\_\_\_ 32. The smallest particle of an element is called a(n) atom. \_\_\_\_\_
- \_\_\_\_\_ 33. A(n) mixture is made of two or more substances—elements, compounds, or both—that are together in the same place but are not chemically combined. \_\_\_\_\_
- \_\_\_\_\_ 34. A substance that undergoes a chemical change is still the same substance after the change.  
\_\_\_\_\_
- \_\_\_\_\_ 35. A change that produces one or more new substances is called a physical change.  
\_\_\_\_\_
- \_\_\_\_\_ 36. The energy stored in food is called electromagnetic energy. \_\_\_\_\_
- \_\_\_\_\_ 37. During photosynthesis, plants transform electromagnetic energy from the sun into chemical energy as they make molecules of sugar. \_\_\_\_\_

- \_\_\_\_\_ 38. The new substances produced by a chemical change have properties identical to those of the original substances. \_\_\_\_\_
- \_\_\_\_\_ 39. Every chemical or physical change in matter includes a change in energy. \_\_\_\_\_
- \_\_\_\_\_ 40. Flammability is an example of a chemical property. \_\_\_\_\_

## Completion

*Complete each statement.*

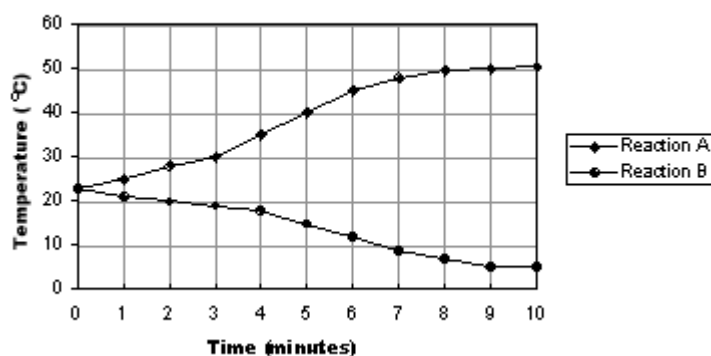
41. Every form of matter has two kinds of properties—physical properties and \_\_\_\_\_ properties.
42. Hardness, texture, color, and freezing point are examples of \_\_\_\_\_ properties of matter.
43. A compound may be represented by a(n) \_\_\_\_\_, which shows the elements in the compound and the ratio of atoms.
44. A(n) \_\_\_\_\_ is a group of two or more atoms that are held together by chemical bonds.
45. A(n) \_\_\_\_\_ is a substance formed from two or more elements that are chemically combined in a set ratio.
46. A(n) \_\_\_\_\_ is formed when two or more substances are so evenly mixed that you can't see the different parts.
47. In a(n) \_\_\_\_\_ mixture, like a salad, you can see the different parts.
48. Dissolving a spoonful of sugar in tea or coffee is an example of a(n) \_\_\_\_\_ change.
49. The tarnishing of metal is an example of a(n) \_\_\_\_\_ change.
50. The fact that matter is not created or destroyed in any chemical or physical change is called the \_\_\_\_\_.
51. A rubber band pulled tight and about to snap has \_\_\_\_\_ energy.
52. Visible light is one example of \_\_\_\_\_ energy, a form of energy that travels through space as waves.
53. The burning of a fuel transforms \_\_\_\_\_ energy and releases it as thermal energy and electromagnetic energy.
54. \_\_\_\_\_ is a measure of the average energy of random motion of particles of matter.
55. \_\_\_\_\_ energy, the total energy of all of the particles in an object, always flows from warmer matter to cooler matter.
56. The three familiar states of matter are solid, \_\_\_\_\_, and gas.

57. The slow combination of a shiny metal with another substance that produces a dark coating on the metal is called \_\_\_\_\_.
58. The energy your body obtains when you eat food originally comes from the \_\_\_\_\_.
59. Energy is released to the surroundings during a(n) \_\_\_\_\_ change.
60. Like matter, \_\_\_\_\_ is never created or destroyed in chemical reactions.

### Short Answer

Use the diagram to answer each question.

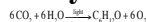
#### Energy of Two Reactions



61. Which reaction is more likely to involve the melting of ice? Explain your reasoning.
62. How did the temperature change in reaction A differ from that in reaction B?
63. Which reaction is more likely to involve a form of combustion? Explain your reasoning.
64. Which reaction is endothermic? Explain your reasoning.
65. Which reaction is exothermic? Explain your reasoning.
66. Which reaction results in a smaller change in temperature over time?

Use the following equation to answer each question.

#### Photosynthesis



67. Does this equation describe a physical or chemical change?
68. Does the equation show that matter is conserved in the reaction? Explain.
69. How is energy transformed during this reaction?
70. In addition to carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O), what else is needed for the reaction to occur?

71. Is photosynthesis an endothermic or exothermic reaction? Explain.
72. Water is one of the substances involved in photosynthesis. What is the ratio of hydrogen atoms to oxygen atoms in a water molecule?

### Essay

73. Explain how you could find out whether or not an unknown liquid was water.
74. Explain the difference between a mixture and a compound.
75. Explain the difference between atoms and molecules.
76. Is the melting of an ice cube considered a physical change or a chemical change? Explain your reasoning.
77. When an electric current is passed through water during the process of electrolysis, two gases are formed. One gas has a boiling point of  $-183^{\circ}\text{C}$  and the other has a boiling point of  $-253^{\circ}\text{C}$ . Was this event a physical change or a chemical change? Explain.
78. Use the concept of energy transformations to explain how the sun provides you with the energy to answer the questions on this test.
79. Plan a procedure to separate the components of a mixture containing sand, salt, and water.
80. Describe what happens to the mass of an iron nail when it rusts, and explain why. Assume that all the rust remains attached to the nail.

## Ch. 2; Physical Science

### Answer Section

#### MULTIPLE CHOICE

1. ANS: D                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.3.b  
BLM: application
2. ANS: A                      PTS: 1                      DIF: L1  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.3  
BLM: knowledge
3. ANS: B                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: application
4. ANS: C                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: application
5. ANS: A                      PTS: 1                      DIF: L1  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3                      BLM: knowledge
6. ANS: C                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.a                      BLM: comprehension
7. ANS: D                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.a                      BLM: application
8. ANS: D                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.b                      BLM: comprehension
9. ANS: D                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.f                      BLM: application
10. ANS: C                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.3 Describe the properties of a mixture.                      STA: S 8.3  
BLM: application
11. ANS: C                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.1.3 Describe the properties of a mixture.                      STA: S 8.3  
BLM: application
12. ANS: D                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.2.1 Describe what a physical change is.                      STA: S 8.5.d  
BLM: application
13. ANS: A                      PTS: 1                      DIF: L2  
OBJ: CaPS.2.2.1 Describe what a physical change is.                      STA: S 8.3  
BLM: analysis



14. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.2.2 Describe what a chemical change is. STA: S 8.5.c  
BLM: application
15. ANS: C PTS: 1 DIF: L2  
OBJ: CaPS.2.2.2 Describe what a chemical change is. STA: S 8.5.a  
BLM: application
16. ANS: C PTS: 1 DIF: L1  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.3 BLM: knowledge
17. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
BLM: comprehension
18. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.  
STA: S 8.5 BLM: application
19. ANS: C PTS: 1 DIF: L2  
OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.  
STA: S 8.5 BLM: comprehension
20. ANS: B PTS: 1 DIF: L1  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5 BLM: knowledge
21. ANS: A PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: application
22. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: application
23. ANS: A PTS: 1 DIF: L2  
OBJ: CaPS.2.2.1 Describe what a physical change is. STA: S 8.5.d  
BLM: application
24. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.3.b  
BLM: application
25. ANS: C PTS: 1 DIF: L1  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: knowledge
26. ANS: D PTS: 1 DIF: L2  
OBJ: CaPS.2.1.3 Describe the properties of a mixture. STA: S 8.3  
BLM: comprehension
27. ANS: A PTS: 1 DIF: L2  
OBJ: CaPS.2.1.3 Describe the properties of a mixture. STA: S 8.3  
BLM: comprehension
28. ANS: B PTS: 1 DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.b BLM: comprehension

29. ANS: C PTS: 1 DIF: L1  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: knowledge
30. ANS: D PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
BLM: comprehension

### MODIFIED TRUE/FALSE

31. ANS: T PTS: 1 DIF: L1  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.3  
BLM: knowledge
32. ANS: T PTS: 1 DIF: L1  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3 BLM: knowledge
33. ANS: T PTS: 1 DIF: L1  
OBJ: CaPS.2.1.3 Describe the properties of a mixture. STA: S 8.3  
BLM: knowledge
34. ANS: F, physical  
PTS: 1 DIF: L1 OBJ: CaPS.2.2.1 Describe what a physical change is.  
STA: S 8.5 BLM: knowledge
35. ANS: F, chemical  
PTS: 1 DIF: L1 OBJ: CaPS.2.2.2 Describe what a chemical change is.  
STA: S 8.5 BLM: knowledge
36. ANS: F, chemical  
PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5 BLM: comprehension
37. ANS: T PTS: 1 DIF: L1  
OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.  
STA: S 8.5 BLM: knowledge
38. ANS: F, different from  
PTS: 1 DIF: L2 OBJ: CaPS.2.2.2 Describe what a chemical change is.  
STA: S 8.5.c BLM: comprehension
39. ANS: T PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.3 BLM: comprehension
40. ANS: T PTS: 1 DIF: L2

OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: application

## COMPLETION

41. ANS: chemical

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.5.a  
BLM: knowledge

42. ANS: physical

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: knowledge

43. ANS: chemical formula

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3 BLM: knowledge

44. ANS: molecule

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3 BLM: knowledge

45. ANS: compound

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3.b BLM: knowledge

46. ANS: homogeneous mixture

PTS: 1 DIF: L1  
OBJ: CaPS.2.1.3 Describe the properties of a mixture. STA: S 8.3  
BLM: knowledge

47. ANS: heterogeneous

PTS: 1 DIF: L2  
OBJ: CaPS.2.1.3 Describe the properties of a mixture. STA: S 8.3  
BLM: application

48. ANS: physical

PTS: 1 DIF: L2 OBJ: CaPS.2.2.1 Describe what a physical change is.  
STA: S 8.5 BLM: application

49. ANS: chemical

PTS: 1 DIF: L2 OBJ: CaPS.2.2.2 Describe what a chemical change is.

STA: S 8.5.a BLM: application

50. ANS: law of conservation of matter

PTS: 1 DIF: L1 OBJ: CaPS.2.2.2 Describe what a chemical change is.

STA: S 8.5.b BLM: knowledge

51. ANS: potential

PTS: 1 DIF: L2

OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.

BLM: application

52. ANS: electromagnetic

PTS: 1 DIF: L1

OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.

BLM: knowledge

53. ANS: chemical

PTS: 1 DIF: L1

OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.

STA: S 8.5.c BLM: knowledge

54. ANS: Temperature

PTS: 1 DIF: L1

OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.

STA: S 8.3.d BLM: knowledge

55. ANS: Thermal

PTS: 1 DIF: L2

OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.

BLM: comprehension

56. ANS: liquid

PTS: 1 DIF: L1 OBJ: CaPS.2.2.1 Describe what a physical change is.

STA: S 8.5.d BLM: knowledge

57. ANS: tarnishing

PTS: 1 DIF: L1 OBJ: CaPS.2.2.2 Describe what a chemical change is.

STA: S 8.5.c BLM: knowledge

58. ANS: sun

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.  
STA: S 8.5 BLM: application

59. ANS: exothermic

PTS: 1 DIF: L1  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: knowledge

60. ANS: energy

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.b BLM: comprehension

## SHORT ANSWER

61. ANS:

Reaction B is more likely to involve the melting of ice. The melting of ice is an endothermic change, a change in which energy is taken in. Based on its decreasing temperature, reaction B appears to be taking in energy in the form of heat. On the other hand, the increasing temperature of reaction A indicates that it is releasing heat rather than absorbing it.

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: application

62. ANS:

In reaction A, the temperature increased, while in reaction B, the temperature decreased.

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: analysis

63. ANS:

Reaction A is more likely to involve a form of combustion. Combustion is a chemical change that releases energy in the form of heat and light, and based on its increasing temperature, reaction A appears to be releasing heat. On the other hand, the decreasing temperature of reaction B indicates that it is absorbing heat rather than releasing it.

PTS: 1 DIF: L3  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: synthesis

64. ANS:

Reaction B is endothermic. An endothermic reaction is a reaction in which energy is taken in. Reaction B shows a decreasing temperature, meaning that it is taking in energy, not releasing it.

PTS: 1 DIF: L3  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: synthesis

65. ANS:

Reaction A is exothermic. An exothermic reaction is a reaction in which energy is released.  
Reaction A shows an increasing temperature, meaning that it is releasing energy, not absorbing

PTS: 1 DIF: L3  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: synthesis

66. ANS:

Reaction B shows a smaller change in temperature.

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
STA: S 8.5.c BLM: analysis

67. ANS:

chemical change

PTS: 1 DIF: L2 OBJ: CaPS.2.2.2 Describe what a chemical change is.  
STA: S 8.5.c BLM: application

68. ANS:

Yes. The law of conservation of matter states that matter is neither created nor destroyed during a chemical or physical change. The equation demonstrates this by showing the same number of atoms on both sides. Each side of the equation has 6 carbon atoms, 12 hydrogen atoms, and 12 oxygen atoms. Thus, no atoms were destroyed or created in the reaction. The atoms that were present at the start of the reaction remained at the end of the reaction.

PTS: 1 DIF: L3 OBJ: CaPS.2.2.2 Describe what a chemical change is.  
STA: S 8.5.b BLM: analysis

69. ANS:

During photosynthesis, electromagnetic energy from the sun is transformed into chemical energy in the form of sugar.

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
BLM: application

70. ANS:

light

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.1 Identify forms of energy that are related to changes in matter.  
BLM: comprehension

71. ANS:  
Photosynthesis is an endothermic reaction because it takes in energy (in the form of light).

PTS: 1 DIF: L2  
OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.  
STA: S 8.5 BLM: application

72. ANS:  
The ratio of hydrogen to oxygen atoms is 2 : 1.

PTS: 1 DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3 BLM: comprehension

## ESSAY

73. ANS:  
You could investigate some of the characteristic properties of the unknown substance. If the unknown substance is water, it will have the same freezing point, the same boiling point, the same density, and the same chemical reactivity as water.

PTS: 1 DIF: L3  
OBJ: CaPS.2.1.1 Identify the properties used to describe matter. STA: S 8.7.c  
BLM: synthesis

74. ANS:  
A mixture consists of two or more substances that are mixed together but are not chemically combined. The individual substances in a mixture keep their separate properties. A compound is a substance formed when two or more elements combine chemically. The properties of a compound are very different from those of the elements that formed it.

PTS: 1 DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds. | CaPS.2.1.3  
Describe the properties of a mixture. STA: S 8.3.b BLM: analysis

75. ANS:  
Atoms are the smallest particles of an element. Atoms can combine with other atoms to form molecules. A molecule is a group of atoms that are joined together and act as a single unit. Molecules can be made of different kinds of atoms or the same kind of atoms. Atoms within a molecule are held together by chemical bonds.

PTS: 1 DIF: L2  
OBJ: CaPS.2.1.2 Define elements and explain how they relate to compounds.  
STA: S 8.3 BLM: analysis

76. ANS:  
The melting of an ice cube is considered a physical change. When an ice cube melts, it changes state from a solid to a liquid, but its composition stays the same (H<sub>2</sub>O). Such a change in state is considered a physical change since no new substance is formed.

PTS: 1 DIF: L2 OBJ: CaPS.2.2.1 Describe what a physical change is.

STA: S 8.5.a | S 8.5.d

BLM: application

77. ANS:

A chemical change has occurred. The boiling point of a substance is a physical property that can be used to identify the substance. Water's boiling point is 100°C. The boiling points of the two gases are evidence that new substances with different properties have been formed.

PTS: 1

DIF: L3

OBJ: CaPS.2.2.2 Describe what a chemical change is.

is.

STA: S 8.5.a

BLM: synthesis

78. ANS:

Sample Answer: Through the process of photosynthesis, plants transform electromagnetic energy from the sun into chemical energy as they make molecules of sugar. The chemical energy stored in plants is transferred to my body when I eat plant-based foods such as carrots. My body then uses this energy to carry out basic functions, such as thinking and writing. When I write answers to this test, the chemical energy I received from plant-based foods is transformed into the energy of motion.

PTS: 1

DIF: L3

OBJ: CaPS.2.3.2 Describe how chemical energy is related to chemical change.

STA: S 8.5

BLM: analysis

79. ANS:

First, pour the entire mixture through a paper filter, which will trap the sand but not the salt and water. Then, distill the remaining saltwater solution. As water boils and rises out of the solution as water vapor, capture it in a long tube. While inside the tube, the water vapor will cool and condense into liquid water, which can then flow into a collecting flask. Any water that remains behind with the salt can be evaporated into the open air, leaving only salt behind.

PTS: 1

DIF: L3

OBJ: CaPS.2.1.3 Describe the properties of a mixture.

STA: S 8.3

BLM: synthesis

80. ANS:

When an iron nail rusts, its mass increases. Rusting is a chemical change known as oxidation, which is the slow combination of a substance, like iron, with oxygen. According to the law of conservation of matter, atoms are neither created nor destroyed; they are just rearranged. Therefore, the mass of a rusted nail will be equal to the mass of the iron in the nail plus the mass of the oxygen from the air that reacts with the iron.

PTS: 1

DIF: L3

OBJ: CaPS.2.2.2 Describe what a chemical change is.

is.

STA: S 8.5.b

BLM: application