

# Study Guide – Chapter 3

## Elements, Compounds, and Mixtures

### Section 1: Elements Pages 56-59

Circle the letter of the best answer for each question.

1. Which of the following processes is NOT a physical or chemical change?
  - a. crushing
  - b. weighing
  - c. melting
  - d. passing electric current

### ELEMENTS, THE SIMPLEST SUBSTANCES

2. A pure substance that cannot be broken down into simpler substances is called what?
  - a. material
  - b. mixture
  - c. element
  - d. chemical

### Only One Type of Particle

3. What is a substance with only one type of particle called?
  - a. element
  - b. pure substance
  - c. mineral
  - d. solution

### PROPERTIES OF ELEMENTS

4. What does NOT affect the characteristic properties of an element?
  - a. the amount of element
  - b. the boiling point
  - c. the type of element
  - d. the density

**Circle the letter of the best answer for each question.**

5. Why does a helium-filled balloon float up when you let go?
- Helium is more dense than air.
  - Helium is less dense than air.
  - Krypton is less dense than helium.
  - Air is less dense than helium.

**Identifying Elements by Their Properties**

Read the description. Then, draw a line from the dot next to each description to the matching word.

- |   |   |             |
|---|---|-------------|
| 6. is a characteristic property of elements   | ● |             |
| 7. can be identified by its unique properties | ● | a. element  |
| 8. combines with oxygen to form rust          | ● | b. hardness |
| 9. has a melting point of 1,495°C             | ● | c. iron     |
|   |   | d. cobalt   |

**CLASSIFYING ELEMENTS BY THEIR PROPERTIES**

Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

nonmetals	metals
elements	metalloids

10. All \_\_\_\_\_ are either metals, metalloids, or nonmetals.
11. Elements that are shiny and conduct heat and electric current are \_\_\_\_\_.
12. Elements that are poor conductors of heat are \_\_\_\_\_.
13. Elements with properties of metals and nonmetals are \_\_\_\_\_.

### Categories Are Similar

Read the description. Then, draw a line from the dot next to each description to the matching word.

- |                                 |   |                  |
|---------------------------------|---|------------------|
| 14. elements that are malleable | ● | a. silicon       |
| 15. a type of metalloid         | ● | b. semiconductor |
| 16. another name for metalloid  | ● | c. metals        |
| 17. elements that are dull      | ● | d. nonmetals     |
- 
- |                              |   |               |
|------------------------------|---|---------------|
| 18. iodine, sulfur, neon     | ● | a. nonmetals  |
| 19. lead, copper, tin        | ● | b. metalloids |
| 20. silicon, boron, antimony | ● | c. metals     |

## Section 2: Compounds Pages 60-63

**Circle the letter of the best answer for each question.**

21. Which of the following substances is a compound?
- a. oxygen
  - b. salt
  - c. magnesium
  - d. copper

### **COMPOUNDS: MADE OF ELEMENTS**

22. What kind of substance is composed of two or more elements that are chemically combined?
- a. element
  - b. compound
  - c. mixture
  - d. particle
23. How do the properties of a compound compare with the properties of the elements that form it?
- a. always the same
  - b. always different
  - c. sometimes the same
  - d. sometimes different

### **The Ratio of Elements in a Compound**

24. How do elements join to form compounds?
- a. never in the same ratio
  - b. in a specific mass ratio
  - c. randomly
  - d. in a 1:8 mass ratio

## PROPERTIES OF COMPOUNDS

**Circle the letter of the best answer for each question.**

25. Which of the following statements about compounds is true?
- a. All compounds react with acid.
  - b. Each compound has its own physical properties.
  - c. Compounds are used to identify elements.
  - d. Compounds are similar to elements.

### Properties: Compounds Versus Elements

26. Why are we able to eat sodium and chlorine in a compound?
- a. Sodium reacts violently with calcium.
  - b. Chlorine is table salt.
  - c. The compound is harmless.
  - d. Sodium is a metal.

## BREAKING DOWN COMPOUNDS

**Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.**

carbonic acid	chemical change	carbon dioxide
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27. The compound that helps give some drinks “fizz” is called \_\_\_\_\_.
28. When you open a soft drink, carbonic acid breaks down into \_\_\_\_\_ and water.
29. The only way to break down compounds is through a \_\_\_\_\_.

## COMPOUNDS IN YOUR WORLD

### **Compounds in Industry**

**Circle the letter of the best answer for each question.**

30. Which of the following compounds is broken down to make aluminum?
- a. mercury oxide
  - b. aluminum oxide
  - c. aluminum chloride
  - d. magnesium oxide

### **Compounds in Nature**

31. Which of the following can form compounds from nitrogen in the air?
- a. bacteria
  - b. pea plants
  - c. animals
  - d. all plants
32. What type of compound do plants and animals use to make proteins?
- a. sugar
  - b. ammonia
  - c. carbon dioxide
  - d. nitrogen compounds
33. What do plants use during photosynthesis to make carbohydrates?
- a. soil
  - b. carbon dioxide
  - c. carbon monoxide
  - d. oxygen

### Section 3: Mixtures Pages 64-70

#### PROPERTIES OF MIXTURES

Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

mixture	compound	physical	identity
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34. A combination of substances that are not chemically combined is called a(n)\_\_\_\_\_.
35. Two or more materials that combine chemically form a(n)\_\_\_\_\_.
36. In a mixture, the \_\_\_\_\_ of the substances doesn't change.
37. Mixtures are separated through \_\_\_\_\_ changes.

Read the description. Then, draw a line from the dot next to each description to the matching word.

- |   |   |                 |
|---|---|-----------------|
| 38. used to separate crude oil                      | ● |                 |
| 39. used to separate a mixture of aluminum and iron | ● | a. distillation |
| 40. used to separate the parts of blood             | ● | b. centrifuge   |
| 41. used to separate sulfur and salt                | ● | c. filter       |
|   |   | d. magnet       |

#### The Ratio of Components in a Mixture

Circle the letter of the best answer for each question.

42. Which of the following affects the color of granite?
- ratio of minerals
  - amount of mixture
  - temperatures of mixture
  - weight of minerals

## **SOLUTIONS**

43. Which of the following is NOT true of solutions?
- a. They contain a solute.
  - b. They contain evenly mixed substances.
  - c. They contain a solvent.
  - d. They look like two substances.
44. When a substance spreads evenly through a mixture, what is the process called?
- a. solute
  - b. dissolving
  - c. chemical change
  - d. solubility
45. What do you call the substance that is dissolved in a solution?
- a. solute
  - b. solvent
  - c. compound
  - d. mixture

**Circle the letter of the best answer for each question.**

46. In a solution, what do you call the substance in which something dissolves?
- a. solute
  - b. solvent
  - c. compound
  - d. mixture



**Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.**

solvent	particles	alloy
soluble	small	

47. Salt is \_\_\_\_\_ in water because it dissolves in water.
48. In a solution of two gases, the substance that is present in the largest amount is called the \_\_\_\_\_.
49. A solid solution of metals or nonmetals dissolved in metal is called a(n) \_\_\_\_\_.
50. A solution contains many small \_\_\_\_\_.
51. The particles in solutions are so \_\_\_\_\_ that they can't be filtered out.

### **CONCENTRATION OF SOLUTIONS**

**Circle the letter of the best answer for each question.**

52. What is a measure of the amount of solute dissolved in a solvent?
- a. solution
  - b. concentration
  - c. mixture
  - d. solvent

### **Concentrated or Dilute?**

53. How does a concentrated solution differ from a dilute solution?
- a. The concentrated solution has more solvent
  - b. The concentrated solution has less solvent
  - c. The concentrated solution has more solute
  - d. The concentrated solution has less solute

## Solubility

Read the words in the box. Read the sentences. **Fill in each blank** with the word or phrase that best completes the sentence.

temperature

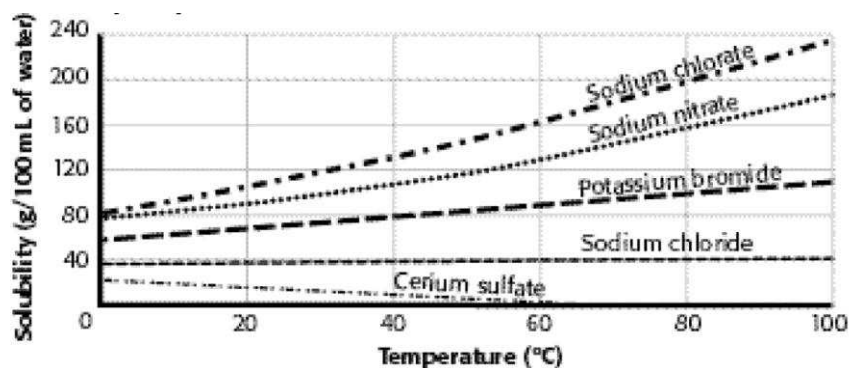
solubility

54. The ability of a solute to dissolve in a solvent is called

\_\_\_\_\_.

55. In a solution, the \_\_\_\_\_ usually affects the solubility.

Use the graph below to answer questions 23 and 24. For each question, **circle the letter** of the best answer for each question.



56. Which solid is less soluble at higher temperatures than at lower temperatures?

- a. sodium chloride
- b. potassium bromide
- c. sodium nitrate
- d. cerium sulfate

57. Which solid's solubility is least affected by temperature changes?

- a. cerium sulfate
- b. sodium nitrate
- c. potassium bromide
- d. sodium chloride

### Dissolving Gases in Liquids

Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

increases	decreases
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58. Solubility of gases in liquids often \_\_\_\_\_ as temperatures rise.
59. Solubility of solids in liquids often \_\_\_\_\_ as temperatures rise.

### Dissolving Solids Faster in Liquids

Circle the letter of the best answer for each question.

60. Which of the following methods will NOT make a solid dissolve faster?
- |             |            |
|-------------|------------|
| a. weighing | c. heating |
| b. crushing | d. mixing  |

### SUSPENSIONS

61. Which of the following statements is NOT true about particles in a suspension?
- They are soluble.
  - They settle out over time.
  - They can block light.
  - They scatter light.

### COLLOIDS

62. What do gelatin, milk, and stick deodorant have in common?
- They are colloids.
  - Particles in each can settle out.
  - They are compounds.
  - They are solutions.