

# Directed Reading B

## Section: Arranging the Elements (pp. 194–201)

1. Why do you think scientists might have been frustrated by the organization of the elements in the early 1860s?

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### DISCOVERING A PATTERN

\_\_\_\_\_ 2. Which arrangement of elements did Mendeleev find produced a repeating pattern of properties?

- a. elements in order of increasing density
- b. elements in order of increasing melting point
- c. elements in order of increasing shine
- d. elements in order of increasing atomic mass

3. A word describing something that occurs or repeats at regular intervals

is \_\_\_\_\_.

4. Mendeleev's table, which shows elements' properties following a pattern that repeats every seven elements, is called the \_\_\_\_\_ table of the elements.

5. How was it possible that Mendeleev was able to predict the properties of elements that no one knew about?

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**CHANGING THE ARRANGEMENT**

- \_\_\_\_\_ **6.** How did Moseley solve the problem of the elements that did not fit the pattern according to their properties?
- a.** He rearranged the elements by atomic mass.
  - b.** He discovered protons, neutrons, and electrons.
  - c.** He discovered the periodic table of elements.
  - d.** He determined the elements' atomic numbers and then arranged them by atomic number.
- \_\_\_\_\_ **7.** In what order are elements arranged horizontally on the periodic table?
- a.** in order of increasing atomic number
  - b.** in order of decreasing atomic number
  - c.** in order of increasing density
  - d.** in order of decreasing density

**PERIODIC TABLE OF THE ELEMENTS**

- \_\_\_\_\_ **8.** Which information is NOT included in each square of the periodic table in your text?
- a.** atomic number
  - b.** chemical symbol
  - c.** melting point
  - d.** atomic mass
- 9.** How can you tell on the periodic table that carbon is a solid at room temperature?

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**THE PERIODIC TABLE AND CLASSES OF ELEMENTS**

- 10.** Elements are classified as metals, nonmetals, or metalloids, according to their \_\_\_\_\_.
- 11.** The number of \_\_\_\_\_ in the outer energy level of an atom helps determine which category an element belongs in.
- 12.** How can the zigzag line on the periodic table help you recognize the elements?

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**13.** Most elements are \_\_\_\_\_, which can be found to the left of the zigzag line on the periodic table.

**14.** Most metals are \_\_\_\_\_ at room temperature.

**15.** What metal is a liquid at room temperature?

\_\_\_\_\_

**16.** What elements are found to the right of the zigzag line on the periodic table?

\_\_\_\_\_

**17.** Semimetals, also called \_\_\_\_\_, are the elements that border the zigzag line on the periodic table.

**DECODING THE PERIODIC TABLE**

**18.** Some elements, such as \_\_\_\_\_, are named after scientists.

Others, such as \_\_\_\_\_, are named after places.

**19.** For most elements, the \_\_\_\_\_ has one or two letters, with the first letter always capitalized.

**20.** Each horizontal row of elements on the periodic table is called a(n)

\_\_\_\_\_.

**21.** Each vertical column of elements on the periodic table is called a(n)

\_\_\_\_\_, or a(n) \_\_\_\_\_.

\_\_\_\_\_ **22.** Which elements often have similar properties?

- a. elements in a period
- b. elements in a group
- c. elements named after places
- d. elements in a horizontal row

\_\_\_\_\_ **23.** The physical and chemical properties of the elements change

- a. within a group.
- b. within a family.
- c. across each period.
- d. across each group.

**24.** The periodic \_\_\_\_\_ states that the repeating chemical and physical properties of elements change periodically with the atomic numbers of the elements.

Skills Worksheet

# Directed Reading B

## Section: Grouping the Elements (pp. 202–209)

- \_\_\_\_\_ 1. What gives elements in a family or group similar properties?
- a. the same atomic mass
  - b. the same number of protons in their nuclei
  - c. the same number of electrons in their outer energy level
  - d. the same number of neutrons
- \_\_\_\_\_ 2. What makes elements reactive at the atomic level?
- a. Their atoms have the same number of neutrons.
  - b. Their atoms have the same number of protons.
  - c. Their atoms have the same number of electrons.
  - d. Their atoms take, give, or share electrons with other atoms.

### GROUP 1: ALKALI METALS

- \_\_\_\_\_ 3. Which of the following is NOT true of alkali metals?
- a. They can be cut with a knife.
  - b. They are usually stored in water.
  - c. They are the most reactive of all the metals.
  - d. They can easily give away their outer-level electron.
4. Elements in Group 1 of the periodic table are called \_\_\_\_\_  
metals.

### GROUP 2: ALKALINE-EARTH METALS

5. Atoms of \_\_\_\_\_ metals have two outer-level electrons.
6. What are two products made from calcium compounds?
- \_\_\_\_\_
- \_\_\_\_\_
7. In what way does calcium help you?
- \_\_\_\_\_
- \_\_\_\_\_
8. Name three alkaline-earth metals besides calcium.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

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**GROUPS 3–12: TRANSITION METALS**

- \_\_\_\_\_ 9. Which of the following characteristics does NOT describe transition metals?
- a. They are good conductors of thermal energy.
  - b. They are more reactive than alkali and alkaline-earth metals.
  - c. They have one or two electrons in the outer energy level.
  - d. They are denser than elements in Groups 1 and 2.
10. Metals that are less reactive than alkali metals and alkaline-earth metals are called \_\_\_\_\_ metals.
11. The two rows of transition metals that are placed at the bottom of the periodic table to save space are called the \_\_\_\_\_ and the \_\_\_\_\_.
12. How is mercury different from other transition metals?

\_\_\_\_\_

\_\_\_\_\_

**GROUP 13: BORON GROUP**

13. The most common element from Group 13 and the most abundant metal in Earth's crust is \_\_\_\_\_.
14. What are some of the uses of aluminum?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**GROUP 14: CARBON GROUP**

15. What are three compounds of carbon that are necessary for living things on Earth?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
16. The metalloids \_\_\_\_\_ and \_\_\_\_\_, both in Group 14, are used to make computer chips.

**Directed Reading B** *continued*

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17. The hardest material known is \_\_\_\_\_.

18. What are some of the uses of diamond?

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19. What form of carbon is used as a pigment in paints and crayons?

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**GROUP 15: NITROGEN GROUP**

20. Nitrogen is a(n) \_\_\_\_\_ at room temperature.

21. Each element in the nitrogen group has \_\_\_\_\_ electrons in the outer level.

22. Nitrogen from the air can react with what element to make ammonia for fertilizer?

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**GROUP 16: OXYGEN GROUP**

23. How is oxygen different from the other four elements in Group 16?

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24. The element \_\_\_\_\_ can be found as a yellow solid in nature and is used to make sulfuric acid.

25. Why is oxygen important?

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**GROUP 17: HALOGENS**

26. The atoms of \_\_\_\_\_ need to gain only one electron to have a complete outer level.

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**27.** What important use do the halogens iodine and chlorine have in common?

\_\_\_\_\_

\_\_\_\_\_

**28.** Halogens combine with most metals to form \_\_\_\_\_,  
such as \_\_\_\_\_ chloride.

**GROUP 18: NOBLE GASES**

\_\_\_\_\_ **29.** Which of the following statements about noble gases is NOT true?

- a.** They are colorless and odorless at room temperature.
- b.** They have a complete set of electrons in their outer energy level.
- c.** They normally react with other elements.
- d.** All of them are found in Earth's atmosphere in small amounts.

**30.** Noble gases were first called \_\_\_\_\_ gases because scientists thought they would not react at all.

**31.** The atoms of \_\_\_\_\_ gases have a full set of electrons in their outer level.

**32.** The low \_\_\_\_\_ of helium makes blimps and weather balloons float.

**HYDROGEN**

\_\_\_\_\_ **33.** Which of the following statements about hydrogen is NOT true?

- a.** It is useful as rocket fuel.
- b.** It is the most abundant element in the universe.
- c.** Its physical properties are closer to those of nonmetals than to those of metals.
- d.** It has two electrons in its outer energy level.