

CHAPTER

12

DIRECTED READING WORKSHEET

# The Periodic Table

As you read Chapter 12, which begins on page 300 of your textbook, answer the following questions.

### Would You Believe . . . ? (p. 300)

1. Hyraxes are related to elephants, even though they don't look alike. What have scientists similarly discovered about different-looking elements?

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2. The periodic table is useful for \_\_\_\_\_ the known elements and predicting the \_\_\_\_\_ of unknown elements.

### What Do You Think? (p. 301)

Answer these questions in your ScienceLog now. Then later, you'll have a chance to revise your answers based on what you've learned.

### Investigate! (p. 301)

3. What will you be looking for in this activity?

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### Section 1: Arranging the Elements (p. 302)

4. Why do you think scientists might have been frustrated by the organization of the elements before 1869?

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**Chapter 12, continued**

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**Discovering a Pattern** (p. 302)

5. Mendeleev spent a lot of train rides organizing the elements according to their properties. Which arrangement of elements produced a repeating pattern of properties?
- a. by increasing density
  - b. by increasing melting point
  - c. by increasing shine
  - d. by increasing atomic mass

6. How are the days of the week periodic?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Mendeleev noticed after arranging the elements that similar \_\_\_\_\_ and \_\_\_\_\_ properties could be observed in every \_\_\_\_\_ element.

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

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**Changing the Arrangement** (p. 303)

9. A few elements in Mendeleev's table seemed to be mysteriously out of place according to their properties. How did Moseley solve the mystery? (Circle all that apply.)
- a. He rearranged the elements by atomic number.
  - b. He discovered protons, neutrons, and electrons.
  - c. He disproved the periodic law.
  - d. He determined the number of protons in an atom.

10. The basis of the periodic table is the periodic \_\_\_\_\_, which states that the properties of elements are \_\_\_\_\_ of their atomic \_\_\_\_\_.

Chapter 12, continued

Use the periodic table on pages 304–305 of your text to fill in the answers to the following questions.

11. 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
12. How can you tell that chlorine is a gas at room temperature?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

13. Rows of elements are called \_\_\_\_\_, and columns of elements are called \_\_\_\_\_ or \_\_\_\_\_.
14. Who will approve the names of the newest elements?
- a. the scientist who discovered each element
  - b. an international committee of scientists
  - c. the chemists from a research institute
15. Silicon is a \_\_\_\_\_.  
(metal, nonmetal, or metalloid)

**Finding Your Way Around the Periodic Table** (p. 306)

16. The properties of elements determine whether elements are classified as metals, nonmetals, or metalloids. The number of \_\_\_\_\_ in the outer \_\_\_\_\_ level of an atom helps determine which of these three categories an element belongs to.
17. There is a zigzag line on the periodic table. How can it help you?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Chapter 12, continued

Use the pictures on pages 306–307 to help you match the category in Column B with the description in Column A, and write the corresponding letter in the space provided. Categories may be used more than once.

Column A	Column B
___ 18. few electrons in the outer energy level	<b>a.</b> metals
___ 19. have some properties of the other two categories	<b>b.</b> nonmetals
___ 20. brittle and nonmalleable solids	<b>c.</b> metalloids
___ 21. complete or almost-complete set of electrons in the outer energy level	
___ 22. conducts heat from a stovetop to your food	
___ 23. can prevent a spark from igniting gasoline in your car	
___ 24. outer energy level containing a shell of electrons that is about half-complete	
___ 25. formed into electrical wires	
___ 26. flattened into sheets of food wrap without shattering	
___ 27. border the zigzag line on the periodic table	

28. Some elements are named after scientists, like Einstein, and places, like California. True or False? (Circle one.)
29. The chemical symbol Pb comes from the \_\_\_\_\_ word *plumbum*, which means \_\_\_\_\_.
30. What happens as you move from left to right through each period on the periodic table?
- Elements change from having properties of nonmetals to having properties of metals.
  - Elements change from having properties of metalloids to having properties of metals.
  - Elements change from liquids to gases.
  - None of the above

**Review** (p. 309)

Now that you've finished Section 1, review what you learned by answering the Review questions in your ScienceLog.

## CHAPTER

## 12

## DIRECTED READING WORKSHEET

*The Periodic Table*

As you read Chapter 12, which begins on page 300 of your textbook, answer the following questions.

**Would You Believe . . . ?** (p. 300)

1. Hyraxes are related to elephants, even though they don't look alike. What have scientists similarly discovered about different-looking elements?

Sample answer: Scientists have discovered that many different-looking elements have common properties.

2. The periodic table is useful for \_\_\_\_\_ organizing \_\_\_\_\_ the known elements and predicting the \_\_\_\_\_ properties \_\_\_\_\_ of unknown elements.

**What Do You Think?** (p. 301)

Answer these questions in your ScienceLog now. Then later, you'll have a chance to revise your answers based on what you've learned.

**Investigate!** (p. 301)

3. What will you be looking for in this activity?

Sample answer: I will be looking for a pattern in the arrangement of the teacher's seating chart.

**Section 1: Arranging the Elements** (p. 302)

4. Why do you think scientists might have been frustrated by the organization of the elements before 1869?

Accept any reasonable answer. Sample answer: Scientists might have been frustrated because the elements weren't organized and therefore their properties couldn't be predicted.



**Chapter 12, continued**

**Discovering a Pattern** (p. 302)

5. Mendeleev spent a lot of train rides organizing the elements according to their properties. Which arrangement of elements produced a repeating pattern of properties?
- a. by increasing density
  - b. by increasing melting point
  - c. by increasing shine
  - d. by increasing atomic mass

6. How are the days of the week periodic?

The days of the week are periodic because they have a regular, repeating pattern; they repeat in the same order every 7 days.

7. Mendeleev noticed after arranging the elements that similar \_\_\_\_\_ physical \_\_\_\_\_ and \_\_\_\_\_ chemical \_\_\_\_\_ properties could be observed in every \_\_\_\_\_ eighth \_\_\_\_\_ element.

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

Mendeleev was able to predict the properties of unknown elements by using the pattern of properties in the periodic table.

**Changing the Arrangement** (p. 303)

9. A few elements in Mendeleev’s table seemed to be mysteriously out of place according to their properties. How did Moseley solve the mystery? (Circle all that apply.)

- a. He rearranged the elements by atomic number.
- b. He discovered protons, neutrons, and electrons.
- c. He disproved the periodic law.
- d. He determined the number of protons in an atom.

10. The basis of the periodic table is the periodic

\_\_\_\_\_ law \_\_\_\_\_, which states that the properties of elements are \_\_\_\_\_ functions \_\_\_\_\_ of their atomic \_\_\_\_\_ numbers \_\_\_\_\_.

## Chapter 12, continued

Use the periodic table on pages 304–305 of your text to fill in the answers to the following questions.

11. 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

12. How can you tell that chlorine is a gas at room temperature?

Sample answer: Chemical symbols are color-coded on the periodic table according to state. The color of the chemical symbol for chlorine is green, which corresponds to a gas.

13. Rows of elements are called \_\_\_\_\_ periods \_\_\_\_\_, and columns of elements are called \_\_\_\_\_ groups \_\_\_\_\_ or \_\_\_\_\_ families \_\_\_\_\_.

14. Who will approve the names of the newest elements?

- a. the scientist who discovered each element
- b. an international committee of scientists
- c. the chemists from a research institute

15. Silicon is a \_\_\_\_\_ metalloid \_\_\_\_\_.  
(metal, nonmetal, or metalloid)

**Finding Your Way Around the Periodic Table** (p. 306)

16. The properties of elements determine whether elements are classified as metals, nonmetals, or metalloids. The number of \_\_\_\_\_ electrons \_\_\_\_\_ in the outer \_\_\_\_\_ energy \_\_\_\_\_ level of an atom helps determine which of these three categories an element belongs to.

17. There is a zigzag line on the periodic table. How can it help you?

The zigzag line can help me recognize which elements are metals, which are nonmetals, and which are metalloids.

## Chapter 12, continued

Use the pictures on pages 306–307 to help you match the category in Column B with the description in Column A, and write the corresponding letter in the space provided. Categories may be used more than once.

Column A	Column B
<u>  a  </u> 18. few electrons in the outer energy level	<b>a.</b> metals
<u>  c  </u> 19. have some properties of the other two categories	<b>b.</b> nonmetals
<u>  b  </u> 20. brittle and nonmalleable solids	<b>c.</b> metalloids
<u>  b  </u> 21. complete or almost-complete set of electrons in the outer energy level	
<u>  a  </u> 22. conducts heat from a stovetop to your food	
<u>  b  </u> 23. can prevent a spark from igniting gasoline in your car	
<u>  c  </u> 24. outer energy level containing a shell of electrons that is about half-complete	
<u>  a  </u> 25. formed into electrical wires	
<u>  a  </u> 26. flattened into sheets of food wrap without shattering	
<u>  c  </u> 27. border the zigzag line on the periodic table	

28. Some elements are named after scientists, like Einstein, and places, like California. True or False? (Circle one.)

29. The chemical symbol Pb comes from the

\_\_\_\_\_ **Latin** \_\_\_\_\_ word *plumbum*, which means  
\_\_\_\_\_ **lead** \_\_\_\_\_ .

30. What happens as you move from left to right through each period on the periodic table?

- a.** Elements change from having properties of nonmetals to having properties of metals.
- b.** Elements change from having properties of metalloids to having properties of metals.
- c.** Elements change from liquids to gases.
- d.** None of the above

### Review (p. 309)

Now that you've finished Section 1, review what you learned by answering the Review questions in your ScienceLog.