

Chapter 12 – The Periodic Table

Directed Reading A**Section: Arranging the Elements**

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

DISCOVERING A PATTERN

- _____ 2. Which arrangement of elements did Mendeleev find produced a repeating pattern of properties?
- a. by increasing density
 - b. by increasing melting point
 - c. by increasing shine
 - d. by increasing atomic mass
3. When something occurs or repeats at regular intervals, it is called _____.
4. Mendeleev's table, which shows elements' properties following a pattern that repeats every seven elements, is called the _____.
5. How was it possible that Mendeleev was able to predict the properties of elements that no one knew about?

Directed Reading A continued**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 disproved the periodic law.
 - d. He determined the elements' atomic number and then arranged them by atomic number.
7. When the repeating chemical and physical properties of elements change periodically with the elements' atomic numbers, it is called the _____.

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?
- _____
- _____
- _____

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?
- _____
- _____
- _____

Directed Reading A *continued*

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

14. Most metals are _____, which means that they can be drawn into thin wires.

15. Most metals are _____ at room temperature.

16. Most metals are malleable. What does this mean?

17. What metal is flattened into sheets that are made into cans and foil?

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

19. Semiconductors, also called _____, are the elements that border the zigzag line on the periodic table.

DECODING THE PERIODIC TABLE

_____ **20.** Which elements often share properties?

a. those in a period

c. those with the same color

b. those in a group

d. those in a horizontal row

_____ **21.** The physical and chemical properties of the elements change

a. within a group.

c. across each period.

b. within a family.

d. across each group.

22. For most elements, the _____ has one or two letters, with the first letter always capitalized.

23. Horizontal rows of elements on the periodic table are called _____.

24. Vertical columns of elements on the periodic table are called _____, or _____.

25. Some elements, such as _____, are named after scientists. Others, such as _____, are named after places.

Directed Reading A

Section: Grouping the Elements

- _____ 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 total electrons

GROUP 1: ALKALI METALS

- _____ 2. 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 electron.
3. Elements in Group 1 of the periodic table are called _____.

GROUP 2: ALKALINE-EARTH METALS

4. Atoms of _____ have two outer-level electrons.
5. What are two products made from calcium compounds?
- _____
- _____
- _____

6. In what way does calcium help you?
- _____
- _____
- _____

7. Name three alkaline-earth metals besides calcium.
- _____
- _____
- _____

Directed Reading A *continued***GROUPS 3–12: TRANSITION METALS**

- _____ 8. 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.
9. Metals that are less reactive than alkali metals and alkaline-earth metals are called _____.
10. How is mercury different from other transition metals?
- _____
- _____
11. Two rows of transition metals are placed at the bottom of the periodic table to save space. Elements in the first row are called _____.
- Elements in the second row are called _____.
12. Which lanthanide forms a compound that enables you to see red on a computer screen?
- _____
13. Which actinide is used in some smoke detectors?
- _____

GROUP 13: BORON GROUP

14. Why did Emperor Napoleon III of France use aluminum dinnerware?
- _____
- _____
- _____
15. What are some of the uses of aluminum?
- _____
- _____
- _____

Directed Reading A *continued*

GROUP 14: CARBON GROUP

16. The metalloids _____ and _____, both in Group 14, are used to make computer chips.

17. What are three compounds of carbon that are necessary for living things on Earth?

18. The hardest material known is _____.

19. What are some of the uses of diamond?

20. What form of carbon is used as a pigment?

GROUP 15: NITROGEN GROUP

21. Nitrogen is a _____ at room temperature.

22. Each element in the Nitrogen Group has _____ electrons in the outer level.

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

GROUP 16: OXYGEN GROUP

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

25. The element _____ can be found as a yellow solid in nature and is used to make sulfuric acid.

26. Why is oxygen important?

Directed Reading A *continued***GROUP 17: HALOGENS**

27. The atoms of _____ need to gain only one electron to have a complete outer level.
28. What important use do the halogens iodine and chlorine have in common?
- _____
- _____
29. Halogens combine with most metals to form _____, such as _____.
30. How does chlorinating water help protect people?
- _____
- _____
- _____

GROUP 18: NOBLE GASES

- _____ 31. 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.
32. The atoms of _____ have a full set of electrons in their outer level.
33. The low _____ of helium makes blimps and weather balloons float.

HYDROGEN

- _____ 34. 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.