Name: _____ Date: _____

CONTENT 15.1

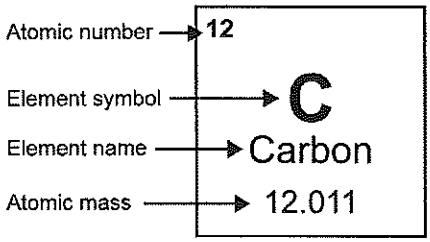
15.1 The Periodic Table

Many science laboratories have a copy of the periodic table of the elements on display. This important chart holds an amazing amount of information. In this skill sheet, you will use a periodic table to identify information about specific elements, make calculations, and make predictions

READ

Periodic table primer

To work through this skill sheet, you will use the periodic table of the elements. The periodic table shows five basic pieces of information. Four are labeled on the graphic at right; the fifth piece of information is the location of the element in the table itself. The location shows the element group, chemical behavior, approximate atomic mass and size, and other characteristic properties.



PRACTICE

Review: Atomic number, Symbol, and Atomic Mass

Use the periodic table to find the answers to the following questions. As you become more familiar with the layout of the periodic table, you'll be able to find this information quickly.

Atomic Number: Write the name of the element that corresponds to each of the following atomic numbers.

1. 9	2. 18	3. 25	4. 15	5. 43

6. What does the atomic number tell you about an element?

Symbol and atomic mass: For each of the following, write the element name that corresponds to the symbol. In addition, write the atomic mass for each element.

7. Fe	8. Cs	9. Si	10. Na	11. Bi

12. What does the atomic mass tell you about an element?

13. Why isn't the atomic mass always a whole number?

14. Why don't we include the mass of an atom's electrons in the atomic mass?

CONTENT 15.1

PRACTICE

Periodic Table Groups

The periodic table's vertical columns are called groups. Groups of elements have similar properties. Use the periodic table and the information found in Chapter 15 of your text to answer the following questions:

15. The first group of the periodic table is known by what name?

16. Name two characteristics of the elements in the first group.

17. Name three members of the halogen group.

18. Describe two characteristics of halogens.

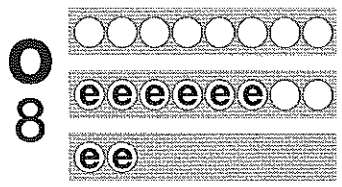
19. Where are the noble gases found on the periodic table?

20. Why are the noble gases sometimes called the *inert gases*?

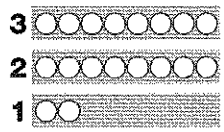
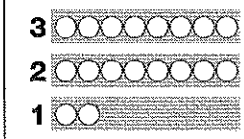
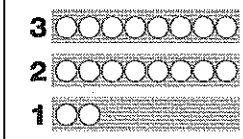
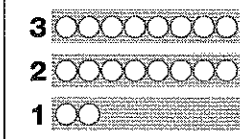
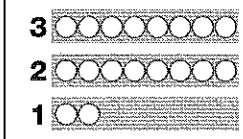
PRACTICE

Periodic Table Rows

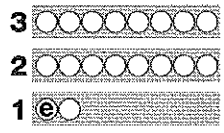
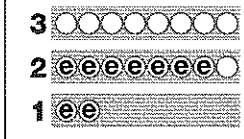
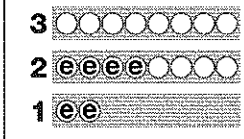
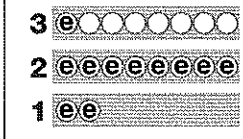
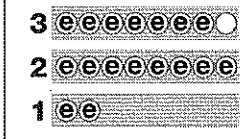
The rows of the periodic table correspond to the energy levels in the atom. The first energy level can accept up to two electrons. The second and third energy levels can accept up to eight electrons each. The example to the right shows how the electrons of an oxygen atom fill the energy level.



Show how the electrons are arranged in energy levels in the following atoms:.

21. He	22. N	23. Ne	24. Al	25. Ar
				

Identify each of the following elements:.

26.	27.	28.	29.	30.
				

Name: _____ Date: _____

CONTENT 16.1

16.1 Dot Diagrams

READ

You have learned that atoms are composed of protons, neutrons, and electrons. The electrons occupy energy levels that surround the nucleus in the form of an "electron cloud." The electrons that are involved in forming chemical bonds are called **valence electrons**. Atoms can have up to eight valence electrons. These electrons exist in the outermost region of the electron cloud, often called the "valence shell."

The most stable atoms have eight valence electrons. When an atom has eight valence electrons, it is said to have a complete *octet*. Atoms will gain or lose electrons in order to complete their octet. In the process of gaining or losing electrons, atoms will form chemical bonds with other atoms. One method we use to show an atom's valence state is called a *dot diagram,* and you will be able to practice drawing these in the following exercise.

What is a dot diagram?

Dot diagrams are composed of two parts—the chemical symbol for the element and the dots surrounding the chemical symbol. Each dot represents one valence electron.

- If an element, such as oxygen (O), has six valence electrons, then six dots will surround the chemical symbol as shown to the right.

- Boron (B) has three valence electrons, so three dots surround the chemical symbol for boron as shown to the right.

There can be up to eight dots around a symbol, depending on the number of valence electrons the atom has. The first four dots are single, and then as more dots are added, they fill in as pairs.

PRACTICE

Using a periodic table, complete the following chart. With this information, draw a dot diagram for each element in the chart. Remember, only the valence electrons are represented in the diagram, not the total number of electrons.

Element	Chemical symbol	Total number of electrons	Number of valence electrons	Dot diagram
Potassium	K			
Nitrogen	N			
Carbon	C			
Beryllium	Be			
Neon	Ne			
Sulfur	S			