

## Skills Worksheet

**Directed Reading B****Section: Development of the Atomic Theory** (pp. 164–171)**THE BEGINNING OF ATOMIC THEORY**

indivisible

1. The word *atom* comes from the Greek word *atomos*, which means
  - a. “dividable.”
  - b. “invisible.”
  - c. “hard particles.”
  - d. “not able to be divided.”
2. The smallest unit of an element that maintains the properties of that element is a(n) atom.

**DALTON’S ATOMIC THEORY BASED ON EXPERIMENTS**

- c. 3. Which of the following was NOT part of Dalton’s theory?
  - a. All substances are made of atoms.
  - b. Atoms of the same element are exactly alike.
  - c. Atoms of different elements are alike.
  - d. Atoms join with other atoms to make new substances.
4. Dalton experimented with different substances. What did his results suggest?

His results suggested that elements combine in certain proportions (ratios) because they are made of atoms.  
ex. 2:1 ratio of Hydrogen to Oxygen to make water.

**THOMSON’S DISCOVERY OF ELECTRONS**

5. In Thomson’s experiments with a cathode-ray tube, he discovered that a(n) positively charged plate attracted the beam. He concluded that the beam was made up of particles that have negatively electric charges.
6. The negatively charged subatomic particles that Thomson discovered are now called electrons.
7. In Thomson’s “plum-pudding” model, electrons are mixed throughout a(n) atom.

**Directed Reading B *continued***

**RUTHERFORD'S ATOMIC "SHOOTING GALLERY"**

- a.** 8. Before his experiment, what did Rutherford expect the particles to do?
- a. He expected the particles to pass right through the gold foil.
  - b. He expected the particles to deflect to the sides of the gold foil.
  - c. He expected the particles to bounce straight back.
  - d. He expected the particles to become negatively charged.
9. What were the surprising results of Rutherford's gold-foil experiment?

Some of the particles bounced straight back, and some were deflected (bounced to the side). This led to his theory that atoms are mostly empty space with a small nucleus in the middle with positive charges that can repel the positive particles striking it to reflect some back. Most of the particles however, go right through the spaces between the nuclei.

**THE NUCLEUS AND THE ELECTRONS**

- d.** 10. In 1911, Rutherford revised the atomic theory. Which of the following is NOT part of that theory?
- a. Atoms are mostly empty space.
  - b. The nucleus is a tiny, dense, positively charged region.
  - c. Positively charged particles that pass close by the nucleus are pushed away by the positive charges in the nucleus.
  - d. The nucleus is made up of protons and electrons.
11. How did Rutherford's model describe the atom?

In Rutherford's model the electrons surround the nucleus at a distance, making a relatively large empty space between adjacent (next to each other) nuclei.

**Match the correct description with the correct term. Write the letter in the space provided.**

nucleus

12. an atom's central region, made up of protons and neutrons

a. electrons

electron cloud

13. region around the nucleus where electrons are likely to be found

b. electron cloud

electrons

14. particles that Bohr suggested move around the nucleus in definite paths

c. nucleus

15. Each electron's definite energy is based on its energy level (orbital number n)

**Directed Reading B** *continued*

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**THE SIZE OF AN ATOM**

**b.** 16. Which of the following statements is true?

- a. A penny has about 20,000 atoms.
- b. A penny has more atoms than Earth has people.
- c. Aluminum is made up of large-sized atoms.
- d. Aluminum atoms have a diameter of about 3 cm.

17. One of the tools that scientists now use to observe atoms is

the scanning tunneling electron microscope

Skills Worksheet

# Directed Reading B

## Section: The Atom (pp. 172–179)

### THE PARTS OF AN ATOM

Match the correct description with the correct term. Write the letter in the space provided.

- |                        |  |                           |
|------------------------|--|---------------------------|
| neutron                | 1. particle found in the nucleus that has no electrical charge | a. electron               |
| proton                 | 2. particle found in the nucleus that is positively charged    | b. atomic mass unit (amu) |
| ion                    | 3. particle with an unequal number of protons and electrons    | c. nucleus                |
| electron               | 4. negatively charged particle found outside the nucleus       | d. proton                 |
| nucleus                | 5. contains most of the mass of an atom                        | e. ion                    |
| atomic mass unit (amu) | 6. SI unit that describes the mass of an atom or molecule      | f. neutron                |

### ATOMS AND ELEMENTS

7. The simplest atom is the hydrogen atom. It has one proton and one electron.
8. Neutrons in the atom's nucleus keep two or more protons from moving apart.
9. If you build an atom using two protons, two neutrons, and two electrons, you have built an atom of helium.
10. An atom does not have to have equal numbers of protons and neutrons.
11. The number of protons in the nucleus of an atom is the atomic number of that atom.