

Skills Worksheet

Directed Reading B

Section: Development of the Atomic Theory (pp. 164–171)

THE BEGINNING OF ATOMIC THEORY

- _____ 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) _____.

DALTON’S ATOMIC THEORY BASED ON EXPERIMENTS

- _____ 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?

THOMSON’S DISCOVERY OF ELECTRONS

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

Directed Reading B *continued*

RUTHERFORD'S ATOMIC "SHOOTING GALLERY"

- _____ **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?

THE NUCLEUS AND THE ELECTRONS

- _____ **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?

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

- | | |
|--|--------------------------|
| _____ 12. an atom's central region, made up of protons and neutrons | a. electrons |
| | b. electron cloud |
| _____ 13. region around the nucleus where electrons are likely to be found | c. nucleus |
| _____ 14. particles that Bohr suggested move around the nucleus in definite paths | |
| 15. Each electron's definite energy is based on its _____. | |

Directed Reading B *continued*

THE SIZE OF AN ATOM

- _____ **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 _____.

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.

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

ATOMS AND ELEMENTS

7. The simplest atom is the _____ atom. It has one _____ and one _____.
8. Neutrons in the atom's _____ 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 _____.
10. An atom does not have to have equal numbers of _____ and _____.
11. The number of protons in the nucleus of an atom is the _____ of that atom.

Directed Reading B *continued*

ISOTOPES

- _____ **12.** Two different isotopes of the same atom have
- a.** the same number of protons.
 - b.** the same number of neutrons.
 - c.** a different atomic number.
 - d.** the same mass.
- _____ **13.** Which of the following is NOT true about unstable atoms?
- a.** They are radioactive.
 - b.** They have a nucleus that always remains the same.
 - c.** They give off energy as they fall apart.
 - d.** They give off smaller particles as they fall apart.
- _____ **14.** What is the mass number of an isotope that has 5 protons, 6 neutrons, and 5 electrons?
- a.** 1
 - b.** 11
 - c.** 10
 - d.** 16
- _____ **15.** If carbon has an atomic number of 6, how many neutrons does carbon-12 have?
- a.** 12
 - b.** 8
 - c.** 6
 - d.** 18
- 16.** Most elements contain a mixture of two or more _____.
- 17.** The weighted average of the masses of all the naturally occurring isotopes of an element is the _____.

FORCES IN ATOMS

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

- | | |
|---|---------------------------------|
| _____ 18. helps protons stay together in the nucleus | a. gravitational force |
| _____ 19. pulls objects toward one another | b. electromagnetic force |
| _____ 20. an important force in radioactive atoms | c. strong force |
| _____ 21. holds the electrons around the nucleus | d. weak force |