Discovering Parts of an Atom

A. Early Ideas About Matter

1. Many ancient Greek philosophers, such as Aristotle, thought that all matter was made of only four elements—fire, water, air, and ____________.
2. These early scientists were not able to ______________ their theories.
3. Democritus proposed that matter is made of small, indivisible objects called _____________.
4. He proposed that different types of ________________ are made from different types of atoms.

B. Dalton’s Atomic Model

1. John Dalton proposed the ________________ theory, which was based on careful observations and ________________ of chemical reactions.
2. Dalton’s theory states that atoms cannot be divided, ________________, or destroyed.
3. It also stated that atoms of one ______________ are different from atoms of other ________________.

C. The Atom

1. A(n) ________________ is the smallest piece of an element that still represents that element.
2. Atoms were first seen by using a(n) ________________ microscope.

D. Thomson—Discovering Electrons

1. Thomson discovered that the rays in a(n) ________________ were attracted to a(n) ________________ charged plate, which means that the rays have a(n) ________________ charge.
2. Thomson’s atomic model stated that an atom is a positively charged ________________ with ________________ throughout it.

E. Rutherford—Discovering the Nucleus

1. Rutherford’s student performed an experiment during which they shot ________________ particles into a piece of ________________ foil.
Lesson Outline continued

2. The results showed that most of the particles traveled through the foil, but some bounced to the __________ and a few bounced straight back.

3. Rutherford’s resulting atomic model proposed that most of an atom’s __________ and __________ charge is concentrated in the center of the atom.
   a. The _______________ is the small, positively charged area in the center of the atom.
   b. In the nucleus is the _______________, which is an atomic particle with one positive charge.

F. Discovering Neutrons
   1. ______________ was one of Rutherford’s colleagues.
   2. Chadwick discovered the _______________, a neutral particle that exists in the __________ of an atom.

G. Bohr’s Atomic Model
   1. The atomic model of ______________ proposed that ___________ move in circular orbits, or __________, around the nucleus.
   2. When energy is added to an atom, electrons move to higher ___________; when energy is released by the electron, it moves back to a lower level.
   3. The limitation of Bohr’s model is that electrons do not actually move in ______________ orbits.

H. The Modern Atomic Model
   1. In modern atomic theory, electrons form a(n) ______________, which is an area around the ______________ in which an electron is likely to be located.
   2. An electron cloud is mostly ______________ space.