Chapter 4 – Atomic Structure

Section 4.1 – Studying Atoms

- _____ believed that all matter consisted of extremely _____ that could not be divided.
- He called these particles _____ from the Greek word "atomos", which meant _____.
- He thought that there were different _____ of atoms with specific sets of _____.
- _____ did not think there was a _____ to the number of times matter could be _____.
- _____ thought that matter could be broken into _____.
- _____ developed a theory to explain why the elements in a _____ always _____ the same way.
- _____proposed the theory that all _____ is made up of individual particles called _____, which cannot be _____.

Dalton's Atomic Theory

- The main point of _____ theory are:
  1. All _____ are composed of _____.
  2. All atoms of the same _____ have the same _____, and atoms of different elements have _____ masses.
  3. _____ contain atoms of more than one _____.
  4. In a particular _____, atoms of different elements always _____ in the same way.
- _____ believed that each type of _____ is represented by a _____ with a different mass.
- When some materials are _____, they gain the ability to _____ other materials.
- Based on their _____, such materials are said to have either a _____electric charge.
- Some _____ particles can _____ from one location to another.
- A _____ of charged particles is called an _____.
- _____ used a _____ to study atoms.
- A _____ is a glass tube filled with a gas that is attached to a source of _____.
- The beam created is the _____.
- When _____ are placed around the glass tube, the cathode ray _____ toward the _____ charged plate.
- _____ concluded that the particles in the cathode ray have a _____, and he called them _____.
- _____ experiments provided the first evidence that _____ are made of even smaller _____.
- Since atoms are _____, Thomson's model shows a _____ charged area with _____ scattered throughout. This model is known as the _____.

- _____ tested the Thomson's _____.
- Rutherford shot _____ at a gold foil.
- If the _____ was correct, the alpha particles would pass through with a slight _____.
- Most of the _____ actually passed _____ through and some actually _____.
- This led _____ to the conclusion that there was a _____ in the center of the atom and that most of the atom is _____.
- _____ called the center of the atom the _____.
- The _____ is the dense, _____ charged mass located in the _____ of the atom.
- According to _____, all of an atom's positive charge is concentrated in its _____.

Section 4.1 Assessment

1. What theory did Dalton propose about the structure of an atom?

2. What evidence did J.J. Thomson provide about the structure of an atom?

3. What did Rutherford discover about the structure of an atom?

4. What evidence did Thomson have that his glowing beam contained negative particles?

5. Why was Dalton's model of the atom changed after Thomson's experiment?

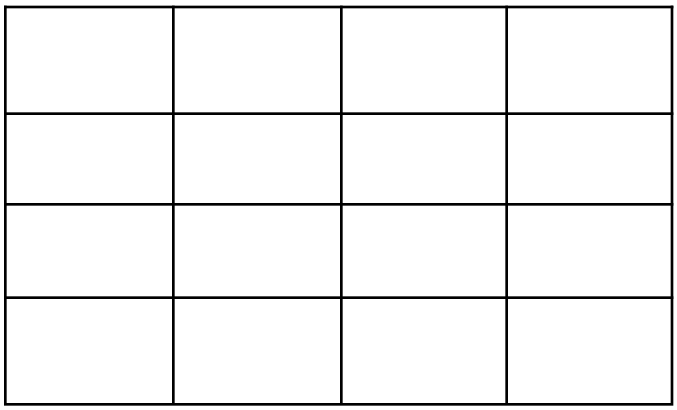
6. If you observed a beam of particles being bent toward a negatively charged plate, what might you conclude?

7. In the Rutherford experiment, why weren't all the alpha particles deflected?

Section 4.2 – Structure of an Atom

- _____ are subatomic particles.
- A _____ is a positively charged particle subatomic particle that is found in the _____ of an atom. A proton has a ____charge.
- An _____ is a negatively charged subatomic particle that is found in the space _____ the nucleus. An electron has a ___ charge.

- A _____ is a neutral subatomic particle that is found in the _____ of an atom. It has about the _____ as a proton.
- Protons, electrons, and neutrons can be distinguished by _____.



- The _____ of any given _____ always have the same number of _____.
- The _____ of an element equals the _____ in an atom of that element.
- _____ of different elements have different _____.
- Each _____ in an atom is balanced by a _____ because atoms are _____.
- So the _____ of an element also equals the _____ in an atom.
- The _____ of an atom is the sum of the _____ in the nucleus of that atom.

  Number of neutrons =
- _____ are atoms of the same _____ that have different numbers of _____ and different _____.
- _____ of an element have the same _____ but different mass numbers because they have different numbers of _____.
- _____ are referred to in the following way: carbon – 12, carbon – 13, and carbon – 14.
- With most elements, it is hard to notice any _____ in the physical or chemical _____ of their _____.

Section 4.2 Assessment

1. Name three subatomic particles.

2. Name three properties you could use to distinguish a proton from an electron.
3. Which characteristic of an atom always varies among atoms of different elements?

4. How are the isotopes of an element different from one another?

5. What do neutrons and protons have in common? How are they different?

6. How can atoms be neutral if they contain charged particles?

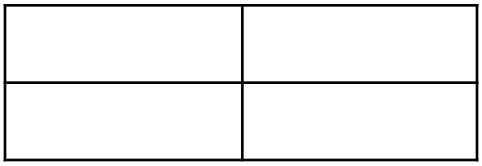
7. What is the difference between atoms of oxygen – 16 and oxygen – 17?

8. What property do protons can electrons have that neutrons do not?

9. Explain why it isn't possible for an atom to have a mass number of 10 and an atomic number of 12.

Section 4.3 – Modern Atomic Theory

- In _____ model, the electrons move with constant speed in fixed _____ around the _____.
- Each _____ in an atom has a specific amount of _____.
- If an atom _____ energy, the energy level of an _____ can change.
- The possible energies that _____ in an atom can have are called _____.
- An _____ in an atom can move from one energy level to another when the atom _____ energy.
- The movement of _____ between energy levels explains the _____ you see when fireworks explode. _____ is a form of _____.
- Because no two _____ have the same set of _____, different elements emit different _____ of light.
- When all the _____ in an atom have the _____ energy possible, the atom is said to be in its _____.
- If one or more _____ have jumped to _____ energy levels, the atom is said to be in its _____.
- Each _____ can hold a maximum number of _____.



- An _____ shows the placement of electrons in the _____.

Sections 4.3 Assessment

1. When is an electron in an atom likely to move from one energy level to another?

2. What model do scientists use to describe how electrons move around the nucleus?
3. Describe the most stable configuration of the electrons in an atom.

4. What did Bohr contribute to modern atomic theory?

5. What does an electron cloud represent?

6. A boron atom has two electrons in the first energy level and three in the second energy level. Compare the relative energies of the electrons in these two energy levels.