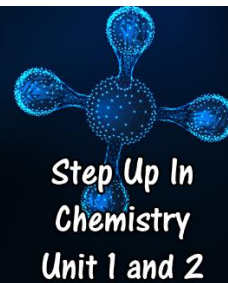


1.1 Atomic Structure

Problems Worksheet



1. Modern atomic theory is often thought to have started with John Dalton.
 - a. Which parts of Dalton's hypothesis are still supported by modern atomic theory?

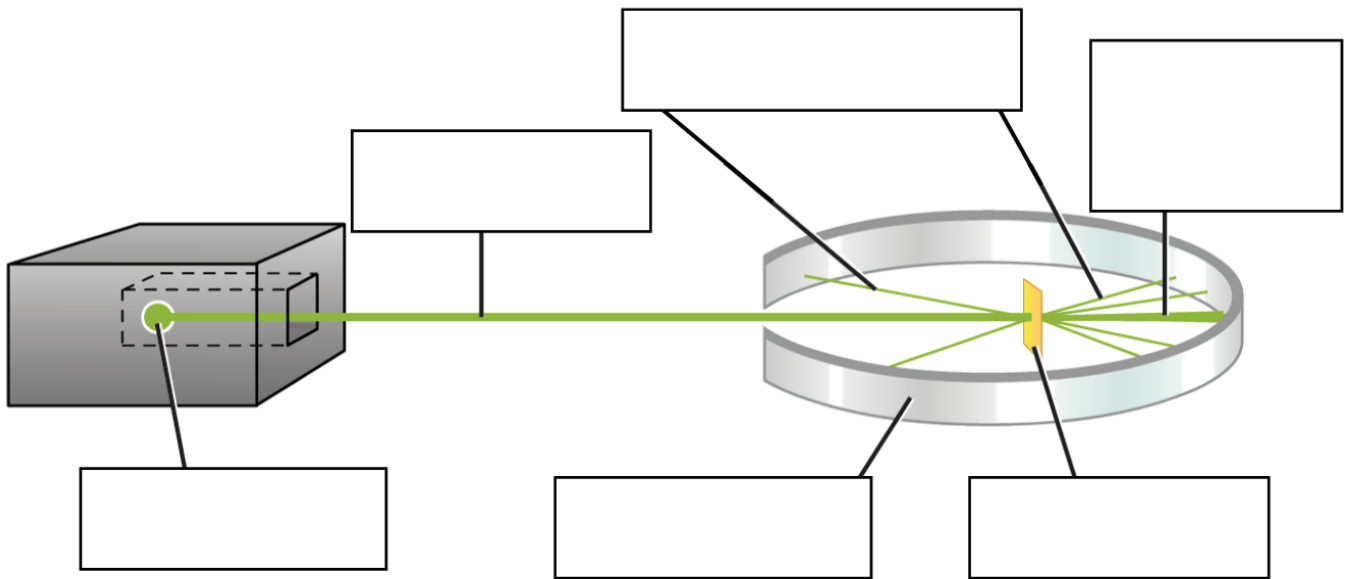
 - b. Which parts of his hypothesis do we now know are untrue?

2. Part of the atomic theory of the day was changed by J. J. Thomson.
 - a. How did Thompson's discovery change atomic theory?

 - b. Describe Thompson's model of the atom.

3. Early in the 20th century, Rutherford, Geiger and Marsden carried out one of the most famous experiments in chemistry; the gold foil experiment.

a. Label the diagram showing the experiment.



b. Why did some of the α particles go straight through while others were deflected?

c. What important discoveries resulted from this experiment?

4. Complete the table showing the properties of the subatomic particles.

Particle	Location	Charge	Mass (u)

5. Most lithium atoms contain 3 protons, 4 neutrons and 3 electrons.

a. Write the complete symbol for the lithium atom.

b. Draw a diagram of the lithium atom.

c. How many valence electrons does lithium have?

d. Lithium usually loses one electron to form a cation. Write the complete symbol for this cation.

6. Write the electron configuration for the following:

a. C

f. Cl^-

b. Cl

g. Ar

c. Mg

h. Ca

d. Al

i. Ca^{2+}

e. Ne

j. S^{2-}

7. Electrons are arranged into shells around the nucleus of an atom.

a. Explain what is meant by the valence shell of an atom.

b. How does the valence shell affect the stability of atoms?

c. How many electrons can be held in the first, second, third and fourth shells.

d. Why is the electron configuration of calcium 2,8,8,2 and not 2,8,10?

8. Complete the table below:

Symbol	Protons	Neutrons	Electrons
	2	2	2
${}^9_4\text{Be}$			
	10	10	10
${}^{27}_{13}\text{Al}^{3+}$			
	14	14	14
	17	18	18