Classification of Matter, Physical/Chemical Properties, Scientific Method and the Atom

1. Define the following:
   a. element
   b. compound
   c. homogeneous mixture
   d. heterogeneous mixture

2. Classify the following mixtures as an element, compound, homogeneous mixture or heterogeneous mixture:
   a. Neon
   b. Salt (sodium chloride)
   c. Pure water
   d. Pure air
   e. Iced tea with ice
   f. Soda

3. Define diatomic elements. What are the diatomic elements?

4. What is the difference between a chemical change and a physical change?

5. What is the difference between a chemical property and a physical property?

6. Identify the following as a physical or chemical property:
   a. malleable
   b. flammable
   c. combustible
   d. brittle

7. Identify the following as a physical or chemical change:
   a. boiling
   b. torn in half
   c. burning
   d. fizzing

8. What are the steps of the scientific method?

9. What is the difference between a theory and a law?

10. What is the difference between a dependent and an independent variable?

11. What are the three fundamental particles of an atom? What are their charges and masses?

12. How can you find the number of protons, neutrons and electrons of an atom?

13. How many protons, neutrons and electrons do the following atoms have?
   a. Iron-56
   b. Hydrogen-3
   c. Chromium-54
   d. \(^{238}\text{U}\)^2-
   e. \(^{42}\text{Ca}\)^2+
   f. \(^{81}\text{Br}\)-


15. Most of an atom’s volume is taken up by the ____________. 

16. Most of an atom’s mass is taken up by the ____________. 

17. Who discovered the electron and how did he do it?

18. Who discovered the nucleus and how did he do it?

19. Complete the following problems: p. 13 #12, p. 32 #12, p. 34 #17, p. 39 #31, p. 41 #35ab, 36ab, p. 42 #37ab, 38ab, p. 82 47abc, p. 113 #64, 67, 68, 79, p. 114 #80