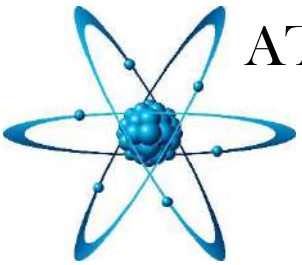
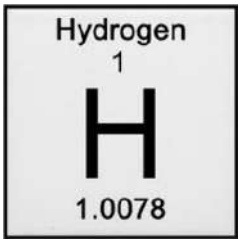
NAME _____ PER_____ DUE DATE _____ MAIL BOX_____

BRING COMPLETED REVIEW PACKET COMPLETE TO THE EXAM, THE DAY OF EXAM - RECEIVE 1 **BONUS PT** ON EXAM
Check your work, find answer key on website



ATOMS and THE PERIODIC TABLE



Matching

____ ATOM

____ATOMIC MASS

____ NUCLEUS

____ ISOTOPES

____ AMU

____ PROTONS

____ NEUTRONS

____ URANIUM

____ ELECTRONS

____ HYDROGEN

1. A unit of mass used to express atomic and molecular weights. One proton or neutron equals one mass unit.

2. This is the center of atom. Most of the mass of the atom is here.

3. These are positively charged particles. They define an atom's identity.

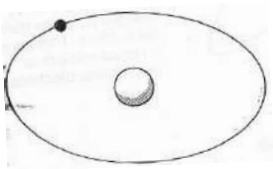
4. These are negatively charged particles. They define an atom's reactivity.

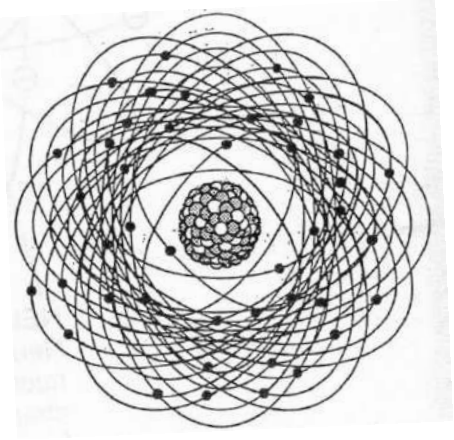
5. These particles add to an atom's mass.

6. The basic unit of a chemical element.

7. The mass of an atom of a chemical element expressed in atomic mass units. It is approximately equivalent to the number of protons and neutrons in the atom (the mass number) or to the average number. This why it is typically expressed with a decimal.

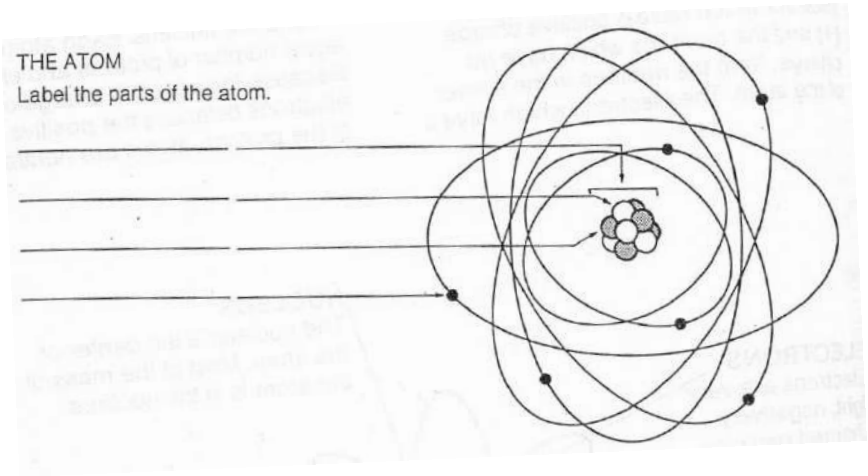
8. Each of two or more forms of the same element that contain equal numbers of protons but different numbers of neutrons in their nuclei, and hence differ in relative atomic mass; in particular, a radioactive form of an element.

9. 

10. 

Read:

An atom is made of three basic particles; neutrons, protons and electrons. These are building blocks of atoms are comprised of particles even smaller still such as quarks, leptons and neutrinos. Protons have a positive charge and neutrons a neutral charge while together they make up the nucleus of an atom. Varying numbers of protons (atomic number) give us the 94 or so naturally occurring elements on earth. Varying numbers of neutrons simply effect atomic mass and give rise to different isotopes of the same element. Atomic mass is the combined mass of both neutrons and protons. The electrons which have a negative charge spin in orbits around the nucleus. Each atom has an equal number of protons and electrons. Because, the negative charge of the electrons balances the positive charge of the protons, making atoms typically neutral. Can you the parts of this atom here? →



Isotopes or Different Elements?

In each of the following statements, you are given a pair of elements and important information about each. Use this information to determine if the pair of elements are isotopes or different elements. Indicate your answer in the space provided.

1. Element D has 6 protons and 7 neutrons.
   Element F has 7 protons and 7 neutrons. _____

2. Element J has 27 protons and 32 neutrons.
   Element L has 27 protons and 33 neutrons. _____

3. Element X has 17 protons and 18 neutrons.
   Element Y has 18 protons and 17 neutrons. _____

4. Element Q has 56 protons and 81 neutrons.
   Element R has 56 protons and 82 neutrons. _____

5. Element T has an atomic number of 20 and an atomic mass of 40.
   Element Z has an atomic number of 20 and an atomic mass of 41. _____

6. Element W has 8 protons and 8 neutrons.
   Element V has 7 protons and 8 neutrons. _____

Atomic Theorems ← commit to memory, commit to memory

1. atomic number **=** proton count

2. proton count **=** electron count

3. atomic mass **(minus)** atomic number = neutron count

4. atomic mass **=** protons **+** neutrons

5. neutrons **do not equal** atomic mass

6. neutrons **do not =** electron count

---

7. Periods **equal** number of electron shells around nucleus

8. Groups **equal** number of valence electrons

7 & 8 Apply only to → (Alkali, Alkaline, BCNO Family, Nonmetals, Halogens and Noble Gases (not Transition Metals)

Using the Atomic Theorems and a Periodic Table these should be easy

→ Fill in blank →

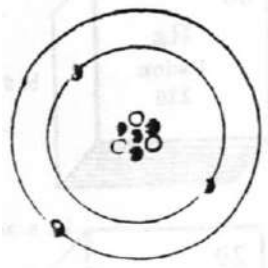
79	1
____	H
Gold	_____
196.967	1.008

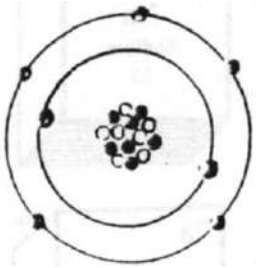
Atomic # = _____
Atomic Mass = _____
# of Protons = _____
# of Neutrons = _____
# of Electrons = _____

Atomic # = _____
Atomic Mass = _____
# of Protons = _____
# of Neutrons = _____
# of Electrons = _____

Using a Periodic Table ID these atoms

→ Label→





Directions: Draw a Bohr Model of the elements below. Show all your work

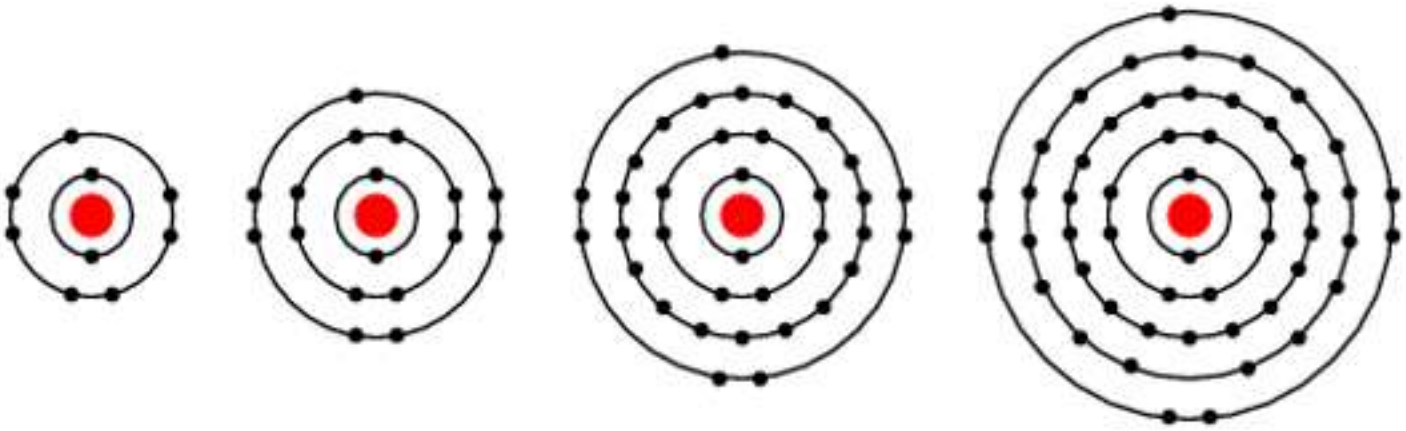
Magnesium 12 **Mg** 24.305	Bohr Model
Protons:	
Neutrons:	
Electrons:	
Atomic #:	
Atomic Mass:	

sulfur 16 **S** 32.065	Bohr Model
Protons:	
Neutrons:	
Electrons:	
Atomic #:	
Atomic Mass:	

Identify each of the following. Which is which?

Iodine - Chlorine - Bromine – Florine

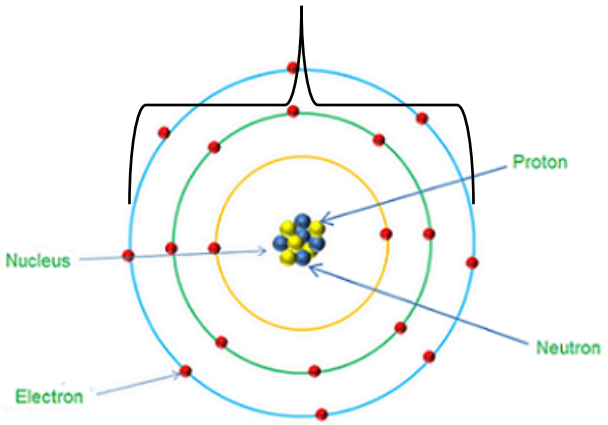
If you're stuck count the shells &/or count valence electrons.



SCALE of ATOMS : 1mm = 1000 micronmeters (um)
1 micrometer = 1000 nanometers (nm) no ruler? call it →→ **40 mm**

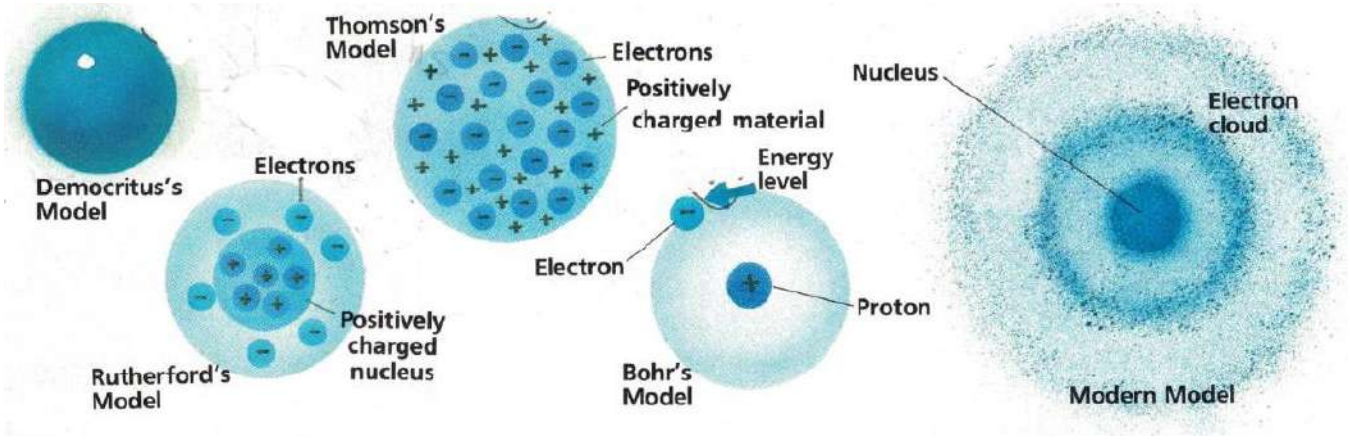
Measure the atom's electron shell diameter.
What is the scale of this model if this atom's valence electron shell is 0.2 **nanometers** in diameter.

1. Measure the atom's diameter, WRITE here→ _____mm = 0.2**nm**
2. Set up a proportion & report what 1mm equals to scale in the box.



Think about it…. I telling you the whole atom equals 0.2nanomters but what about the nuclues in this model or the distance between on electron shel and another???

MODELS OF THE ATOM THROUGHOUT HISTORY



Fill in the physicists' name for each of the below passages. (Hint see scientist names above)

_____ was able to arrive at his model of the atom through careful observations using a cathode ray tube. He called it plum pudding; positive pudding with negative electrons scattered throughout.
A. Dalton **B**. Thomson **C**. Rutherford **D**. Bohr

_____ utilized radioactive decaying material to fire alpha particles at a sheet of gold to arrive at his model. Most of the alpha particles went right through. A few smashed into a densely packed positive nucleus.
A. Dalton **B**. Thomson **C**. Rutherford **D**. Bohr

_____ model paved the way for the present day Modern Model of the atom. He and others proposed electron energy levels or *quanta* to explain the structure of the atom.
A. Dalton **B**. Thomson **C**. Rutherford **D**. Bohr

The Atomic Models - What were the major discoveries that each of the following atomic models represented in its day?

MATCHING

WRITE LETTERS A-E ON THE LINES BELOW

Refer back to classwork, lab and notes for help.

_____ The nucleus is discovered. The atom is found to be mostly empty space. The nucleus is discovered to be an extremely small dense and positively charged region.

_____ The atom is found to be divisible, not indivisible as had long been thought. The electron is identified as a discrete part of the atom with a negative charge. The model is described as "plum pudding".

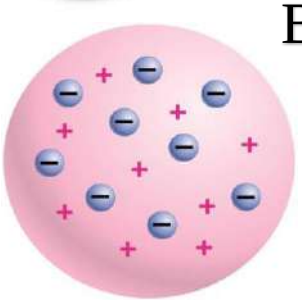
_____ The remaining unexplained mass of the atom is explained with the discovery of the neutron.

_____ For the first time, specific elements are identified by atomic mass - hydrogen, oxygen, nitrogen, sulfur, phosphorus and carbon. Atomic structure still however unknown.

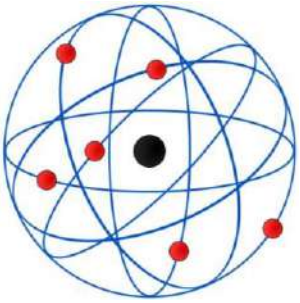
_____ Quantum theory is adopted to explain electron levels and the structure of the atom. The proton also becomes a well-defined particle during this time period.

A

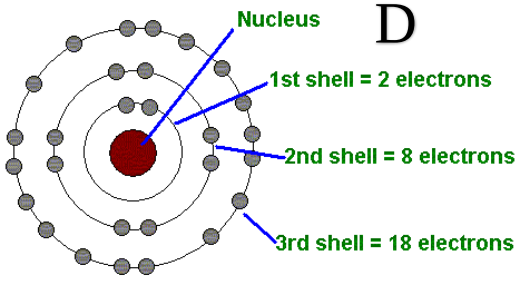
B



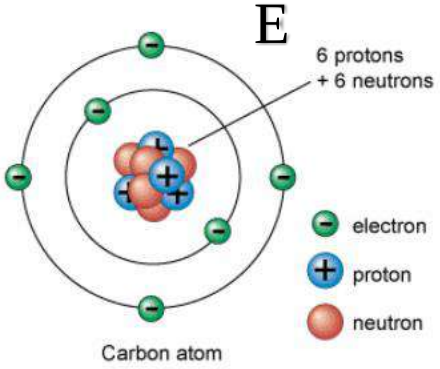
C



D



E



John Dalton ---------- J.J. Thomson ---------- Ernest Rutherford ---------- Niels Bohr ---------- James Chadwick

1766 -1844 | Late 1800s | 1871-1937 | Early 1900s | 1921-1935

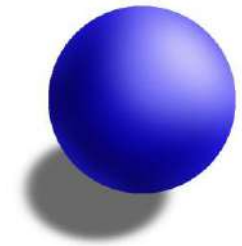
The Atomic Models - What were the major discoveries that each of the following atomic models represented in its day?

Can you label 2-3 keys features in each diagram.

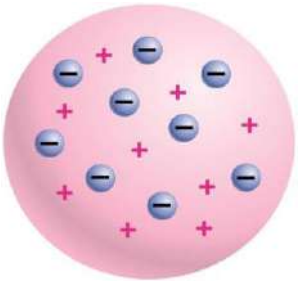
John Dalton ---------- J.J. Thomson ---------- Ernest Rutherford ---------- Niels Bohr ---------- James Chadwick

1766 -1844 | Late 1800s | 1871-1937 | Early 1900s | 1921-1935

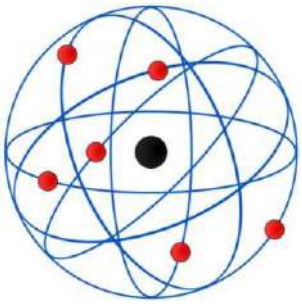
Dalton identifies for the first time specific elements by atomic mass - hydrogen, oxygen, nitrogen, sulfur, phosphorus and carbon. Atomic structure still however unknown.



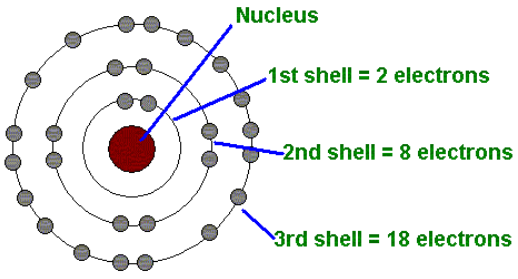
The atom is found to be divisible, not indivisible as had long been thought. Thomson "Father of the Atom" identifies the electron as a discrete part of the atom with a negative charge.



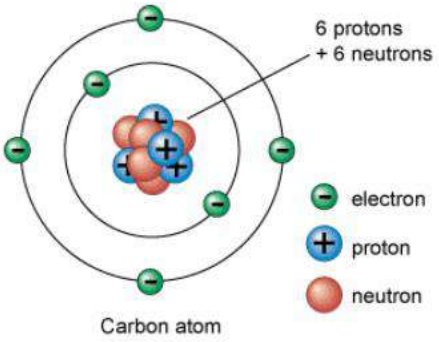
The nucleus is discovered. The atom is found to be mostly empty space. The nucleus is discovered to be an extremely small dense and positively charged region. Rutherford



Quantum theory is adopted to explain electron levels and the structure of the atom. Niels Bohr provides experimental evidence. The proton also becomes a well-defined particle.



The remaining unexplained mass of the atom is explained with the discovery of the neutron by Chadwick.



Periodic Table Group Names

Alkali metals

Group 1: very reactive metals which do not occur freely in nature. 1 electron in outer shell

Alkaline Earth Metals

Group 2: next reactive metals, found in earths crust but not in elemental form. 2 electrons in outer shell

Transition Elements

Group 3-12: metals with varying reactivities. Greater density than Group 1 or 2 elements. 1-2 electrons in outer shell

Lanthanides and Actinides

These elements are also transition elements but have been taken out to prevent the perioidic table being so wide.

Boron Group

Group 13: reactive, contains metal and metalloid. 3 electrons in outer shell

Carbon Group

Group 14: contains metalloids, metals and non metals. 4 electrons in outer shell

Nitrogen Group

Group 15: contains metalloids, metals and non metals. 5 electrons in outer shell

Oxygen Group

Group 16: contains contains metalloids, metals and non metals. Reactive 6 electrons in outer shell

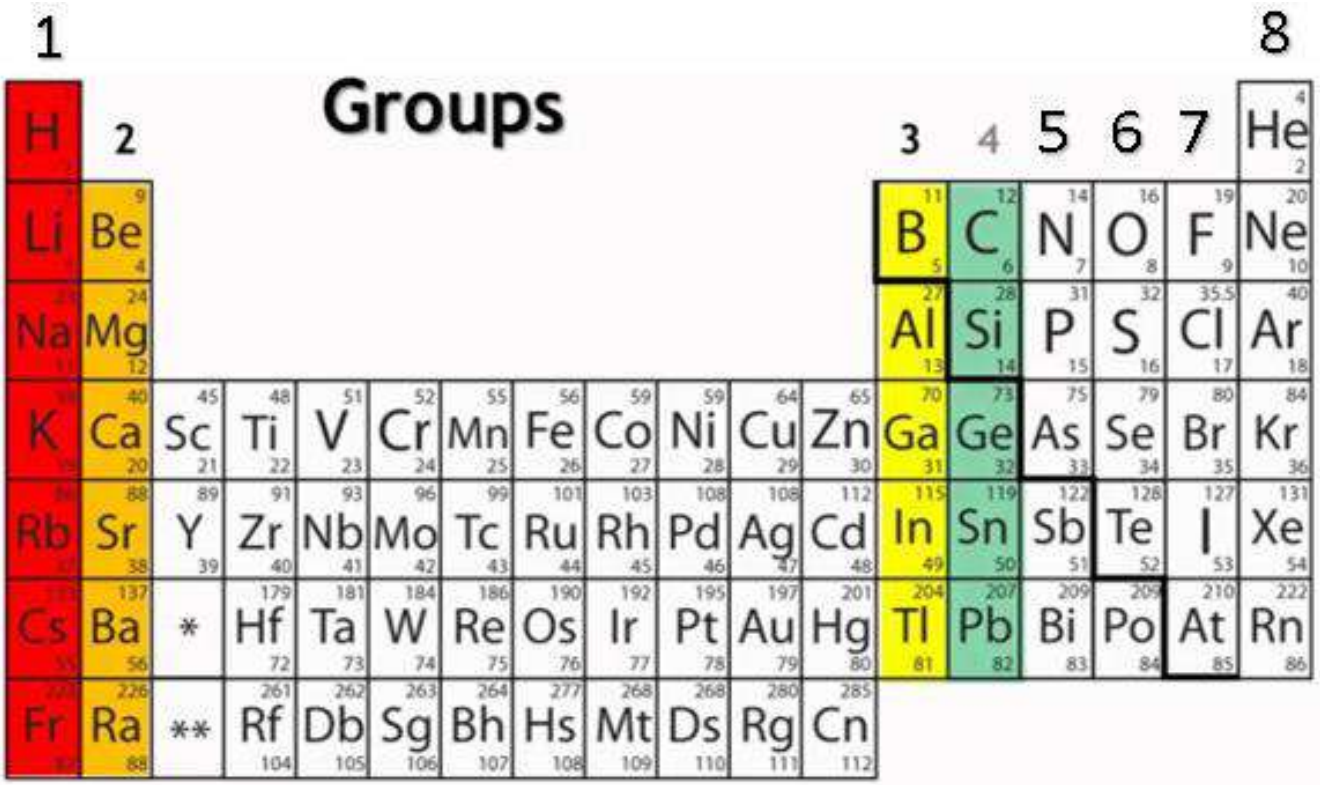
Halogens

Group 17: non-metals, very reactive. 7 electrons in outer shell

Nobel gas

Group 18: non-metals, non reactive. 8 electrons in outer shell

What are the names of each the following groups: 1-8



1._____ 7._____

2._____ 8._____

3._____ 9._____

4._____

5._____

6._____

Read over Groups and their descriptions previous page.

Directions: Answer the following questions in **COMPLETE** sentences.

20. Explain the difference between malleable and ductile.

21. Why are noble gases so stable?

22. How are periods and groups arranged on the periodic table?

1. A substance that conducts an electric current only under certain conditions are MOST likely to be _____.
   a. metals
   b. nonmetals
   c. noble gases
   d. halogens

2. The elements in Groups 3- 12 of the periodic table are the _____.
   a. actinides
   b. alkaline earth metals
   c. transition metals
   d. halogens

3. A family of elements that have two electrons in its outer energy level is known as _____.
   a. actinides
   b. alkaline earth metals
   c. alkali metals
   d. halogens

4. The noble gases are found in _____.
   a. Group 18
   b. Group 2
   c. Group 17
   d. Group 13

5. Elements that lie along the stair – step line of the periodic table are_____.
   a. liquids
   b. metals
   c. metalloids
   d. radioactive

6. Three transition elements in Group 12 of the periodic table _____.
   a. copper, silver, and gold
   b. iron, nickel, and cobalt
   c. mercury, zinc, and cadmium
   d. neon, helium, and xenon

7. A family of elements that contain the reactive metals is the _____.
   a. noble gases
   b. alkaline earth metals
   c. metalloids
   d. halogen

8. Nitrogen has how many valance electrons in it's outer energy level_____,
   a. 8
   b. 10
   c. 5
   d. 6

9. The elements in the Actinoid series are all_____.
   a. metals
   b. nonmetals
   c. radioactive
   d. not radioactive

_____10. An alloy is described as having a mixture of _____ to get the best quality of each element.

a. metals
b. nonmetals
c. gold
d. silver

_____11. Noble gases are known to have _____electrons and it is not necessary to share _____.

a. 5, neutrons
b. 8, electrons
c. 6, atoms
d. 8, element

_____12. O_2, and H_2 are examples of _____.

a. elements
b. noble gases
c. diatomic molecules
d. metalloids

_____13. Both nonmetals and metals have the properties of being able to be rolled into sheets of metal, this is called_____:

a. ductile
b. malleable
c. magnetic
d. flexible

_____14. Which group contains metals, nonmetals, and metalloids_____.

a. Group 12
b. Group 14
c. Group 17
d. Group 16

_____15. According to the periodic table, Hydrogen is considered to be _____.

a. gas
b. nonmetal
c. metal
d. transition metal

_____16. Ce, Dy, and Lu all belong in which series_____.

a. actinide
b. halogen
c. lanthanide
d. noble gases

_____17. All metals are solid at room temperature except_____.

a. carbon
b. alkali metals
c. neon
d. mercury