Chapter 4 Review Worksheet.

Name _Key_

Period _____ Date _____

1. Complete the following table.

Element	Symbol	Number of Protons	Number of electrons	Number of neutrons	Atomic Number	Mass Number
manganese-53	^{53}Mn	25	25	28	25	53
sodium-23	Na	11	11	12	11	23
bromine-80	Br	35	35	45	35	80
yttrium-89	Y	39	39	50	39	89
arsenic-75	As	33	33	42	33	75
actinium-227	Ac	89	89	138	89	227

2. Fill in the following Table

Element	Symbol	Atomic Number	Mass Number	Number of neutrons
nitrogen-15	$^{15}_{7}$N	7	15	8
neon-22	$^{22}_{10}$Ne	10	22	12
Beryllium-9	^{9}Be	4	9	5

3. Use the following information to determine the atomic mass of chlorine. Two isotopes are known: chlorine-35 (mass = 34.97 amu) and chlorine-37 (mass = 36.97 amu). The relative abundance's are 75.4% and 24.6%, respectively.

$$.754(34.97) + .246(36.97) = 35.46 \text{ amu}$$

4. Use the following information to determine the atomic mass of carbon. Two isotopes are known: carbon-12 (mass = 12.000 amu) and carbon-13 (mass = 13.003 amu). Their relative abundance's are 98.9% and 1.10% respectively.

$$.989(12) + .011(13) = 12.011 \text{ amu}$$

5. Given the relative abundance of the following naturally occurring isotopes of oxygen, calculate the average atomic mass of oxygen. Assume that the atomic mass of each is the same as the mass number. oxygen-16: 99.76% oxygen-17: 0.037% oxygen-18: 0.204%

$$.9976(16) + .00037(17) + .00204(18) = 16.00 \text{ amu}$$

6. Distinguish between protons, electrons, and neutrons in terms of their relative masses and charges.

mass $p = n > e$

charge $p +, n \ 0, e \ -$

7. Discuss the structure of an atom including the location of the proton, electron, and neutron with respect to the nucleus.

nucleus $= p + n$, electrons are in region around nucleus

8. Summarize Dalton's atomic Theory

- atoms are indivisible + make up all matter
- elements combine in whole # ratios to form compounds
- chem rxn = nothing created or destroyed
- atoms of same element are identical.

9. In what type of ratios do atoms combine to form compounds?

whole # ratios

E 1. atomic number
F 2. periodic table
C 3. mass number
G 4. group
A 5. isotopes
D 6. atomic mass unit (amu)
B 7. atomic mass
H 8. period
K 9. electrons
I 10. cathode ray
M 11. protons
L 12. neutrons
J 13. nucleus
P 14. atom
N 15. scanning tunneling electron microscope
Q 16. John Dalton
O 17. Democritus

A. atoms that have the same number of protons but different numbers of neutrons
B. weighted average mass of the atoms in a naturally occurring sample of an element
C. equals the number of neutrons plus the number of protons in an atom
D. 1/12 the mass of a carbon-12 atom
E. the number of protons in the nucleus of an atom of an element
F. an arrangement of elements according to similarities in their properties
G. a vertical column of elements in the periodic table
H. a horizontal row of the periodic table
I. stream of electrons produced at the negative electrode of a tube containing a gas at low pressure
J. the central core of an atom, which is composed of protons and neutrons
K. negatively charged subatomic particles
L. subatomic particles with no charge
M. positively charged subatomic particles
N. an instrument used to generate images of individual atoms
O. Greek philosopher who was among the first to suggest the existence of atoms
P. the smallest particle of an element that retains its identity in a chemical reaction
Q. English chemist and schoolteacher who formulated a theory to describe the structure and chemical reactivity of matter in terms of atoms
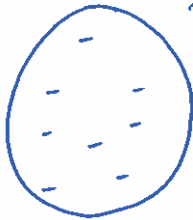
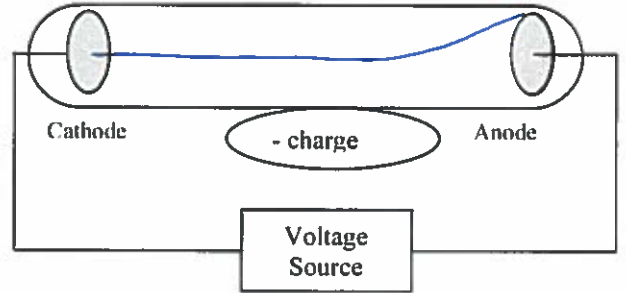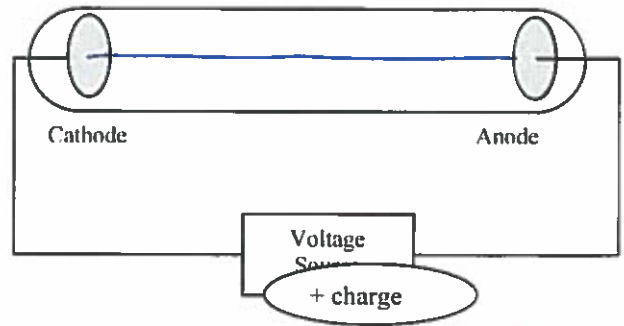1. Who did this experiment?

Thompson

2. Draw in what happened?

3. What properties did he find for the pieces?

negative charge

4. How did he describe the atom?

Positive sphere
w/ - electrons
randomly throughout

Cathode   Anode

Voltage
Source
+ charge

Cathode   - charge   Anode

Voltage
Source

5. Who did this experiment?

Rutherford

6. In the first diagram, draw in what he expected to happen

7. In the second diagram draw in what happened.

8. What did this tell him about the atom?

+ nucleus is present

Lead block
Uranium
Gold

Lead block
Uranium
Gold