Name:_____Date:_____ Per: _____
Environmental Earth Science L2 Mrs. Nork

Study Guide for Quest on Chapter 3: Matter and Atomic Structure

Vocabulary to know: matter, solid, liquid, gas, plasma, atom, electron, neutron, proton, nucleus, energy levels, atomic number, atomic mass, mass number, isotope, element, compound, valence electrons, oxidation number (charge), metals, nonmetals, noble gases, ion, group (family) number, period (row) number, isotope, heterogeneous mixture, homogeneous mixture, solution

Atoms and Atomic Structure

-know how atoms are arranged on the Periodic Table (by atomic #)
-Which elements are metals, nonmetals (know the where the metal/nonmetal "staircase" is on the Periodic Table)
-know what makes atoms "happy" (octet rule) and how atoms with positive and negative charges react
-find # of protons, neutrons, electrons, and atomic #, mass #
-Bohr Model, Lewis Dot (electron dot) diagrams (with valence electrons)
-use Periodic Table to find # of valence electrons and/or oxidation # (charge)
-know when an atom loses or gains electrons (+ or – charge)
-recognize which elements share chemical similarities (as determined by the valence #)

Element, Compound, Mixture

-Know examples of elements, compounds, mixtures (heterogeneous and homogeneous)
-What are solutions classified as?

Good Luck! Let me know if you have any ????s. If you are studying at home and you are stuck, contact me via the school website or my email (ali@nork.com)

Practice problems:

1. Draw **Bohr Models** (showing p^+ n^0 and e^-) for Magnesium (Mg) and Fluorine (F):

Mg: F:

2. Draw Lewis Dot Models for each element below:

H Cl Ca Al Ar

3. Which element above would be the **least likely** to react with other elements? Why?

4. Use the PT (Periodic Table) to find the following info for Selenium (Se):
Atomic # _____ Atomic Mass _____ protons _____ electrons _____ neutrons _____
Valence electrons _____ oxidation # (charge) _____ Will this element gain or lose electrons? _____
Which other elements share reactive similarities with Se? (Hint: look at other elements in the same vertical family)

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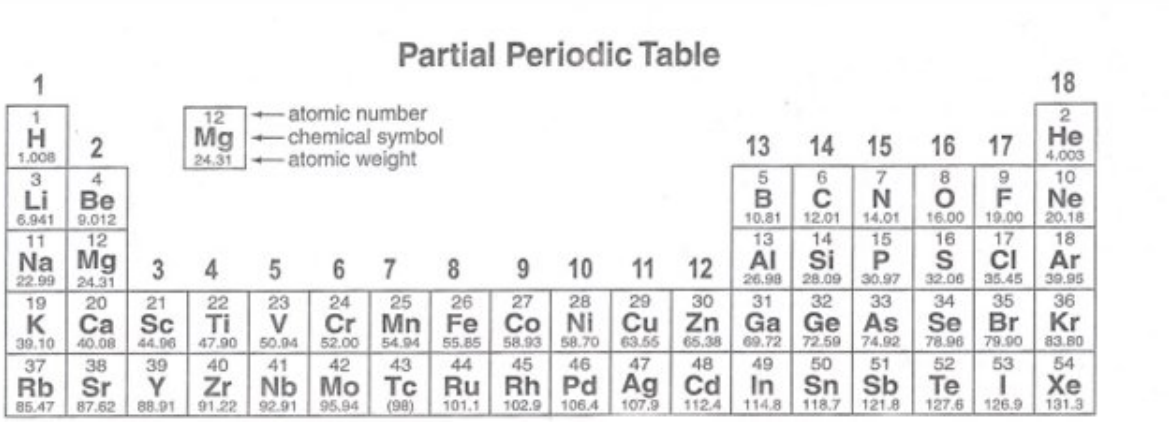
5. Find the charge (oxidation #) for each element and state whether it will gain electrons, lose electrons or fail to react.

Sodium (Na) _____ Oxygen (O) _____

Carbon (C) _____ Neon (Ne) _____

6. How many electrons are located in the 1st energy level? _____ 2nd? _____ 3rd? _____

Use the partial PT to answer below:



_____7. Which of the following is the **most** important factor in determining an element's place in the periodic table?
a. number of protons b. number of neutrons c. atomic charge d. atomic density

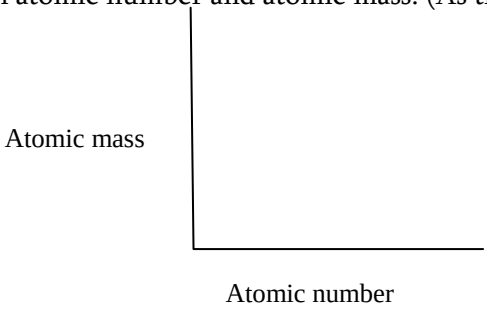
_____8. The chemical properties of an element are determined by its
a. atomic mass. b. electron arrangement. c. proton number. d. atomic size.

_____9. In order to be identified as the element carbon (C), an atom must have _____.
a. 6 protons b. 6 neutrons c. 12 electrons d. 12 electrons

_____10. Group I (the alkali metals) includes lithium (Li), sodium (Na), and potassium (K). These elements have similar chemical properties because they have the same _____.
a. numbers of protons and neutrons c. numbers of protons in the nucleus
b. numbers of electrons in the outer energy level d. numbers of neutrons in the nucleus

_____11. Which of the following is **best** classified as a compound?
a. Helium (He), because it contains only one type of atom
b. Oxygen (O_2), because it contains two of the same type of atoms
c. Carbon dioxide (CO_2), because it contains two different types of atoms
d. Manganese (Mn), because it contains a metal and a nonmetal

12. Draw a line showing the relationship between atomic number and atomic mass. (As the number of protons increases, how is the mass affected?)



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Refer to this portion of the periodic table to answer the questions that follow.

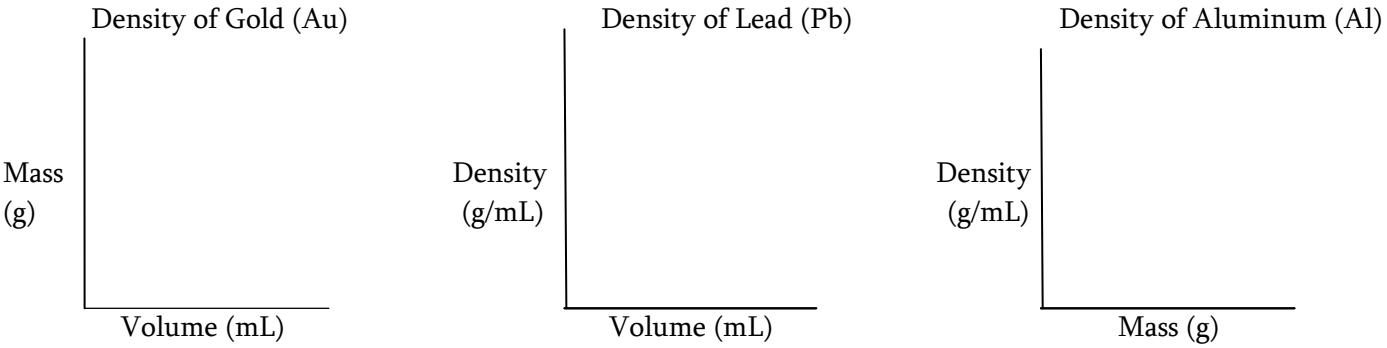
3 Lithium **Li** 6.939 2,1	_____ Beryllium **Be** 9.01218 2,2	5 Boron **B** 10.81 2,3	_____ Carbon **C** 12.011 2,4	7 Nitrogen **N** 14.0067 2,6	8 Oxygen **O** 15.9994 2,6	9 Fluorine **F** 18.9984 2,7	_____ Neon **Ne** 20.183 2,8

13. These elements are listed in which row (period) of the PT? _____ How many electron energy levels does each element have? _____ What do you think the bottom numbers (2, 1; 2, 2; 2, 3; 2, 4) mean?

14. Beryllium, Carbon and Neon are missing their atomic #s. Write these atomic #s in above.

15. Define matter and its 4 states (solid, liquid, gas, plasma). Which 3 are most common on Earth? Which is most common in outer space?

16. I KNOW! We already studied density…But just to see if you remember: Draw a line for each graph showing the relationships between mass, volume, density, etc. Assume temperature and pressures remain constant.



15. Explain how the following terms are related and how they differ: atoms, elements, compounds.

18. Identify each as an element, compound, heterogeneous mixture or homogeneous mixture.

Air _____ Copper _____

Water (H_2O) _____ Cereal _____

Steel _____ Oxygen gas (O_2) _____

Salt (NaCl)_____ soil _____