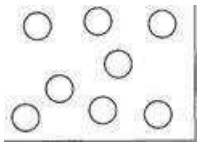
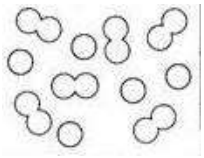
Chemistry Unit Test #2 Review

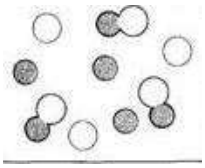
Name:_____

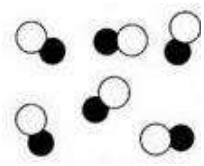
S8P1b. Students will describe the difference between pure substances (elements and compounds) and mixtures.

1. Mud is a good example of
    a. An element.
    b. A compound.
    c. A mixture.
    d. A foible.
2. The air surrounding you is
    a. A compound.
    b. A mixture.
    c. An element.
    d. An eccentricity.
3. Which of the following pictures represents a compound?

a. 

b. 

c. 

d. 

S8P1f. Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.

SPS4. Students will investigate the arrangement of the Periodic Table.
a. Determine the trends of the following:
Number of valence electrons
Types of ions formed by representative elements
Location of metals, nonmetals, and metalloids
Phases at room temperature
b. Use the Periodic Table to predict the above properties for representative elements.

4. The element with properties most similar to Gallium (#31) is
    a. Cadmium (#48).
    b. Silicon (#14).
    c. Zinc (#30).
    d. Indium (#49).

5. Mercury (#80) is a _____ at room temperature.
    a. Solid.
    b. Liquid.
    c. Gas.
    d. Plasma.

6. The Noble Gases fall into Group # ____ on the Periodic Table of the Elements.
    a. 1
    b. 2
    c. 17
    d. 18

7. Most of the elements on the Periodic Table are
    a. Metals.
    b. Non-metals.
    c. Metalloids.
    d. Metroid Prime.

8. Fluorine is an example of a
    a. Metal
    b. Non-metal
    c. Metalloid
    d. Suborbital

9. Which group on the Periodic Table of the Elements is known for being inert?
    a. Group 4.
    b. Group 1.
    c. Group 18.
    d. Group hug.

10. Which two elements have properties that are the most similar?
    a. Mercury (#80) & Bromine (#35)
    b. Sodium (#11) & Chlorine (#17)
    c. Beryllium (#4) & Radium (#88)
    d. Magnesium (#12) & Manganese (#25)

11. How many valence electrons does sulfur (#16) have?
    a. 6
    b. 32
    c. 16
    d. 8

12. Which of the following would be the worst conductor?
    a. Cr (#24)
    b. Sn (#50)
    c. Au (#79)
    d. O (#8)

13. Which of the following would form a cation?
    a. At (#85)
    b. N (#7)
    c. Al (#13)
    d. Ne (10)

14. Which of the following elements has 3 valence electrons?
    a. Li (#3)
    b. B (#5)
    c. P (#15)
    d. Ar (#18)

SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.

a. Calculate density when given a means to determine a substance's mass and volume.

b. Predict formulas for stable binary ionic compounds based on balance of charges.

c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of

*binary ionic compounds (containing representative elements).

*binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).

15. What is the best way to determine the volume of an irregular object?
    a. The displacement method.
    b. The crystal method.
    c. The research method.
    d. The method acting.

16. On a hot summer day you see what appears to be ripples in the air, what causes this "illusion?"
    a. Cold, less dense air is thinner than hot air so you see it.
    b. Water vapor is evaporating and you can see it like steam.
    c. Hot, less dense air is rising through the colder, denser air.
    d. I never saw nuthin, officer.

17. Lead has a density of 11.34 g/ml. If you have a cube of lead with a side that is 5cm long, how much mass will it have?
    a. 56.7g
    b. 11.02g
    c. 2.3g
    d. 1417.5g

18. Pumice Stone has a density of 641kg/m^3. Water has a density of 997 kg/m^3 at the same temperature. If you placed some pumice stone into a container of water, what would happen?
    a. The pumice stone would float.
    b. The pumice stone would sink.
    c. The pumice stone would bob up and down.
    d. The pumice stone would explode violently.

19. If Calcium (Ca) were mixed with Chlorine (Cl) the resulting compound would have the formula
    a. CaCl
    b. $CaCl_2$
    c. Ca_2Cl
    d. CACL

20. The compound that would result from mixing Lithium (Li) with the polyatomic known as Hydroxide (OH) is
    a. LiOH
    b. $Li_3(OH)_2$
    c. OHLi
    d. LiH

21. How would you write the name of the following compound – P_2O_5?
    a. Phosphorous oxide
    b. Diphosphorous pentoxide
    c. Phosphate oxide
    d. Pentaphosphorodioxide

22. What would be the chemical formula for Magnesium fluoride?
    a. MgF
    b. Mg_2F
    c. MgF_2
    d. $Mg_{12}F_9$

23. What is the name of the compound with the formula of CuF_2?
    a. Copper fluoride
    b. Copper difluoride
    c. Copper (II) fluoride
    d. Copper failed twice

24. What is the formula for Sulfur hexabromide?
    a. S_6Br
    b. 6SBr
    c. S_6Br_6
    d. SBr_6

25. What is the formula for tetrasulfur dinitride?
    a. S_4N_2
    b. S_2N_4
    c. SN42
    d. TSDN

Answers and Explanations

1. The correct answer is C. Mud is a mixture of water, and dirt (which is, itself quite a mixture of things).

2. The correct answer is B. Air is 78% Nitrogen, 21% Oxygen and 1% of a bunch of other stuff including water and carbon dioxide.

3. The correct answer is D. The picture shows molecules (two bonded atoms) that are all exactly alike. That is what a compound is. Choice A represents an element (all atoms unbounded and looking exactly alike. Choices B & C show mixtures.

4. The correct answer is D. To answer this, you need an element from the same group (column) on the Periodic table. The only choice that appears in the same column (group) as Gallium is Indium.

5. The correct answer is B. There are only two liquids at room temperature – Mercury (#80) and Bromine (#35).

6. The correct answer is D. If you count the groups across the Periodic Table, the Noble gases are the group in the last column on the right which is #18. They are also inert (nonreactive under normal circumstances). The other named groups students should know are group 1 (Alkali metals – the most reactive metals) and group 17 (Halogens- the most reactive non-metals).

7. The correct answer is A. Most of the Periodic Table elements are also solids.

8. The correct answer is B as it falls to the right of the "stair step" which students should be able to draw on their test copy of the Periodic Table. The "stair step" begins at Boron and goes between aluminum and silicon, then down between germanium and arsenic, then between antimony and tellurium and ends

between polonium and astatine. To the left are the metals, to the right are the nonmetals.

9. The correct answer is C. Group 18 is the Noble Gases which are known for being nonreactive/inert.

10. The correct answer is C. These are the only two that are in the same group (column) and therefore have the most similar properties.

11. The correct answer is A. The way you find the number of valence electrons is by counting across the group. Hydrogen has 1, Helium has 2. You start over with each period (row). So Lithium has 1, Beryllium has 2, Boron has 3….Neon has 8. This counting method works for up to #20 (Calcium). Valence electrons are the ones that are available for reactions. The number will always be between 1 & 8.

12. The correct answer is D. Metals are very good conductors. Non-metals are the worst conductors – they conduct, just not really well. Oxygen is to the right of the "stair step" and is a non-metal.

13. The correct answer is C. Elements with valence electrons less than 4 usually give away those valence electrons, which means they will have more protons (positive charges) than electrons (negative charges) and will end up as a positive ion (cation). Elements with more than 4 valence electrons tend to try and find extra electrons to "steal" which then makes them have more electrons (negatives) that protons (positives), making them negatively charged atoms (anions). Aluminum has 3 valence electrons and so will try to give them away so it would end up with 3 more protons than electrons and it'll have a positive charge (cation).

14. The correct answer is B. Please see the above explanation about valence electrons (#11).

15. The correct answer is A. The displacement method is the method where a person pours water into a measuring device (graduated cylinder usually),

measures how much water is there then adds the object. The person then measures the water again. The measurements are subtracted from one another to see how much water was displaced by the object. The volume displaced is the volume of the object. Archimedes is said to have discovered this method while in the bath and hence ran naked through the streets shouting "Eureka! Eureka!"

16. The correct answer is C. Hot air is less dense than cold air which is why hot air rises and cold air sinks. Less dense substances "float" on more dense substances.

17. The correct answer is D. The formula for density is Density is equal to mass divided by volume (D=m/v). Put the numbers into the formula. The 11.34 goes in for D. The volume of the cube is found by multiplying 5X5X5 = 125. So, put 125 in for v. Use a little algebra magic so that you wind up with 125 X 11.34 which gets you the answer.

18. The correct answer is A. The pumice stone is less dense than the water. Less dense things "float" on more dense things.

19. The correct answer is B. Calcium has 2 valence electrons and so will give those away to become a +2 ion. Chlorine has 7 valence electron and would want to take in 1 more to become a -1 ion. To be a stable compound, the charges of the ions must balance out to zero. It would take 2 of the Chlorine ions (-1 + -1 = -2) to balance and cancel out the Calcium's +2. So, you write the Calcium symbol (Ca) first and then the Chlorine symbol (Cl) next with a subscript of 2. The subscript tells you that there are 2 of that particular element.

20. The correct answer is A. This works just like #19 except instead of a single element to make the anion (negatively charged atom) you have what is known as a polyatomic. The students were given a list of these, including a shorter list of about 6 that I told them they'd need to memorize. Hydroxide (OH) is on that list and will have a -1 charge. Polyatomics are groups of atoms that act as

though they are a single entity. They don't often "break up from one another" in a chemical reaction.

21. The correct answer is B. This is a covalent compound because phosphorous is a non-metal (right of the "stair step") and oxygen is a non-metal and would use the rules for naming covalent compounds. This method uses prefixes to indicate how many of each element there is in the formula. Students have a list of the prefixes. The prefix for 2 is di-. So diphosphorous means you have 2 phosphorous atoms in the compound. Penta- is the prefix meaning five. So pentoxide is how you'd write the name for 5 oxygen atoms in the compound.

22. The correct answer is C. This works like #19.

23. The correct answer is C. This is an ionic compound because copper is a metal (left of the "stair step") and fluorine is a non-metal (right of the "stair step"). The complication is that copper is a transition metal (groups 3-12 on the Periodic Table). Transition metals are called transitional because the valence electrons for these elements get a little wacky and can vary. They aren't steady like the ones in the other groups on the Periodic Table. That means you have to tell the reader what charge that your metal has so they use the right one. The chemical properties between the different charges varies and so, in an experiment, you might use the wrong version and not get the expected results if you aren't told specifically which version to use. The way this is done is by including a Roman numeral to tell the charge of the transitional metal in the name. In this problem the charge on the copper is +2. You know this because it took 2 fluorine atoms (-1 charge each) to balance the copper to get a zero charge. So, the name of copper is written first followed by the Roman numeral 2 (II) in parentheses and then followed by fluorine (for individual non-metals the ending of their name is changed to –ide as a general rule.)

24. The correct answer is D. This is a covalent compound using the prefix naming system. Sulfur has the symbol S. Hexa- is the prefix meaning 6. The symbol for

bromine is Br. This means that hexabromide means literally 6 bromine atoms. You'd represent that in the formula with a subscript of 6 following the Br.

25. The correct answer is A. This works just like #24. Tetra- is the prefix meaning 4 and di- is the prefix meaning 2.