

## Science 10 - Year End Review

Instructions - proper review for previously covered material is always best undertaken by **FIRST** reading through the units notes to reactivate memories and remind you of information covered.

The following questions should be completed on a separate sheet of paper.

### Biology

- 1.) What does DNA stand for?
- 2.) What purpose does DNA exist for? That is, what is DNA for?
- 3.) What are the three main components of DNA?
- 4.) List the 4 bases and which attaches to which?
- 5.) Draw and label a DNA molecule. Be detailed.
- 6.) What is the relationship between a trait, a gene, and a chromosome?
- 7.) Circle the choices that are examples of each of those words.
  - a.) **Homozygous dominant**    AA    Gg    KK    mm    uu    Rr    TT
  - b.) **Homozygous recessive**    ee    Ff    HH    Oo    qq    Uu    ww
- 8.)
  - a.) What is a mutation?
  - b.) Identify the 3 types of mutations.
  - c.) Explain the 3 potential outcomes of mutations.
- 9.) In corn plants, normal height, N, is dominant to short height, n. Complete these four Punnett squares showing different crosses. Then, circle all of the homozygous dominant offspring. Put an X through all the heterozygous offspring. Leave all the homozygous recessive offspring unshaded.

	N	N
n		
n		

	N	n
N		
N		

	N	n
N		
n		

	N	n
n		
n		

- 10.) In humans, being a tongue roller (R) is dominant over non-roller (r). A man who is a non-roller marries a woman who is heterozygous for tongue rolling.

Father's phenotype \_\_\_\_\_ Mother's phenotype \_\_\_\_\_

Father's genotype \_\_\_\_\_ Mother's genotype \_\_\_\_\_


What is the probability of this couple having a child who is a tongue roller? \_\_\_\_\_

11.) Sickle Cell Anemia is condition that shows codominance. The genotype for normal blood cells is NN. Sickle cell trait is the heterozygous condition (NS) and contains both normal and sickle shaped blood cells. Sickle cell disease (SS) is when all of the blood cells are sickle-shaped and has lifelong medical implications. A man with sickle cell trait has a child with a woman with sickle cell trait.

- i. Complete the Punnett Square.
- ii. What is the probability of having a child with sickle cell trait?
- iii. What is the probability of having a normal offspring?
- iv. What is the probability of having a child with sickle cell disease?


12.) The Johnsons are married and their first child has just been born. Erin had a perfectly normal pregnancy and continued working until one week before the child's birth. Joseph and Erin's son appears perfectly normal at birth.

It is quite a shock when the doctor calls them a few days after they take him home to come back in for a few more tests of their son. The doctor asks that both attend, as he would like to talk to both of them. In his office, the doctor lets them know that a blood test was done on their son, as required by law. The blood test revealed their son may have a rare disease called Phenylketonurea (PKU). However, more tests are needed to confirm the diagnosis. The Johnsons are told not to worry as a treatment exists for the condition. But neither Joseph or Erin have ever heard of the condition nor has anyone in their family.

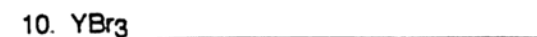
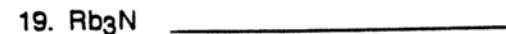
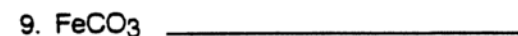
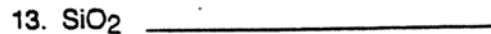
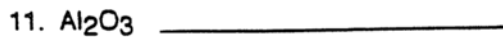
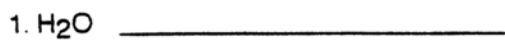
- a.) If all newborns are going to be screened, should parents have the chance to refuse?  
Why or why not?
- b.) Why might someone not want their child screened?
- c.) Should screening for diseases or defects be allowed, if no treatment or cure exists?  
Why or why not.

## Chemistry

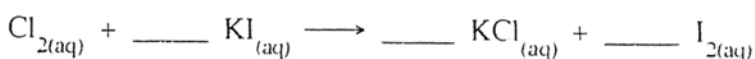
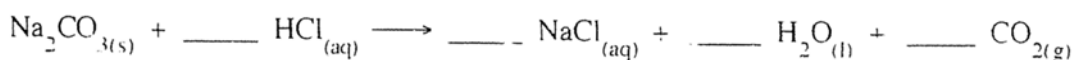
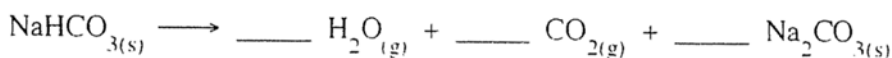
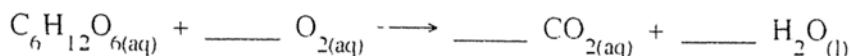
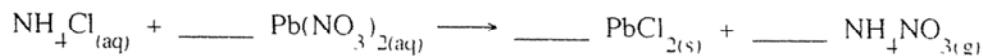
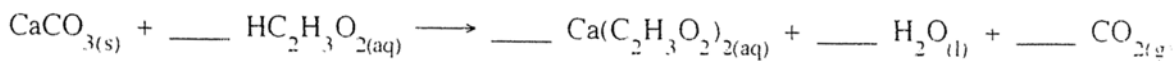
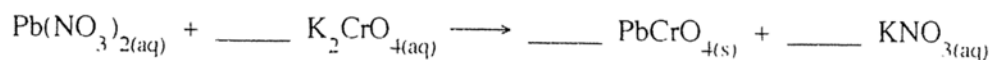
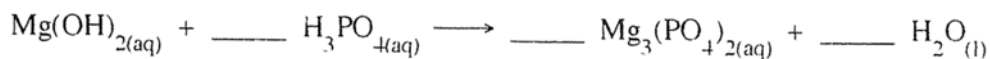
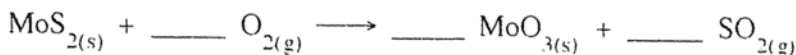
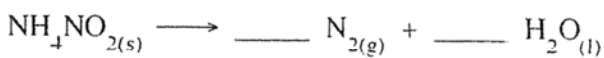
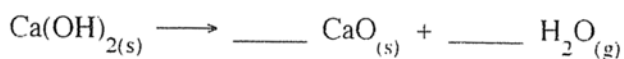
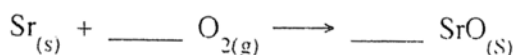
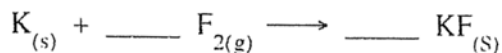
- 1.) Name two metals and two non-metals and describe the general area that metals and non-metals are found on the periodic table.
- 2.) a.) What is the most reactive element on the periodic table (think most dangerous gas)?  
b.) Describe the general trend that occurs on the periodic table that describes where the most and least reactive elements are found.
- 3.) Tell the difference between acids and bases.
- 4.) a.) What indicates that a chemical is an acid or a base?  
b.) What word describes what acids, bases, and salts do when put in water?  
c.) Name two properties of both acids and bases.  
d.) What is the name of the scale used to measure strength of acids and bases.

- e.) Which solution has more  $H^+$  ions, and how much more, in a solution with a pH of 3 than a solution with a pH of 9?
- f.) Write the name and formula of two acids and two bases.
- g.) What are the products when an acid and a base are mixed?
- 5.) Which subatomic particle is the largest and heaviest?
- 6.) Which particle is found in the large open space in an atom?
- 7.) Which particle causes bonding to occur?
- 8.) Which particle decides what element an atom is?
- 9.) Describe how an ionic bond and a covalent bond are formed.
- 10.) Label each of the following compounds as ionic or covalent depending on the type of bond forming them.
- |                           |                        |
|---------------------------|------------------------|
| i.) $Fe_2(SO_4)_3$ _____  | iv.) $NF_3$ _____      |
| ii.) $CO$ _____           | v.) $Zn(NO_3)_2$ _____ |
| iii.) $Ag_2Cr_2O_7$ _____ | vi.) $SiO_2$ _____     |
- 11.) What is the definition of "valence electrons"?
- 12.) Why do we care so much about valence electrons?
- 13.) When do electrons pair?
- 14.) Draw Lewis diagrams of sodium, carbon dioxide, fluorine, and sodium chloride.
- 15.) **A. Write correct formula for these compounds.**
- |                             |                                     |
|-----------------------------|-------------------------------------|
| 1. boron chloride _____     | 11. magnesium carbonate _____       |
| 2. aluminum hydroxide _____ | 12. calcium hydroxide _____         |
| 3. silver sulphide _____    | 13. cesium sulphide _____           |
| 4. iron (II) iodide _____   | 14. carbon tetrachloride _____      |
| 5. copper (I) oxide _____   | 15. hydrogen gas _____              |
| 6. tin (IV) nitrate _____   | 16. carbon disulphide _____         |
| 7. zinc bromide _____       | 17. beryllium nitrate _____         |
| 8. nickel (III) oxide _____ | 18. sodium hydrogen carbonate _____ |
| 9. ruthenium sulphide _____ | 19. water _____                     |
| 10. titanium oxide _____    | 20. lanthanum oxide _____           |

**B. Name the following compounds correctly.**



16.) Balance the following reactions.



17.) Write the **names** of the products expected in each of the following reactions, and **classify** each reaction into one of the six types discussed in the chapter.

- i) the reaction between magnesium and oxygen
- ii) the conversion of calcium nitride into its elements
- iii) the reaction between sodium and water
- iv) the reaction between nitric acid and magnesium hydroxide
- v) the reaction between potassium chromate and silver nitrate

18.) Assume that the formula for candle wax is  $C_{26}H_{54}$ . Write a balanced formula equation for the combustion reaction that occurs when a candle burns.

19.) List four methods of increasing reaction rates, and indicate how each method is understood to work.

20.) List four household substances, 2 of which are acidic and 2 of which are basic.

21.) Pick two indicators from your data booklet or textbook. Describe how each indicator would identify whether the solution was acid or base.

22.) Describe how you would identify an organic and inorganic compound.

b.) Give three examples of common organic compounds, one of which is an acid, and two compounds containing carbon that are not organic.

## Physics

- 1.) What does the word energy mean?
- 2.) List six different forms energy can be in and give examples of objects that have these forms of energy.
- 3.) List three common sources of energy in BC and include a positive and negative aspect of each form.
- 4.) State the entire law of conservation of energy.
- 5.) Write a short equation that embodies the answer of the statement you wrote in question 4.
- 6.) Write down the equation for stored energy and list what each variable stands for, with its unit.
- 7.) Write down the equation for the energy of motion and list what each variable stands for, with its unit.
- 8.) a.) A  $3.0\text{ kg}$  scrub jay is squawking in an oak tree in Mrs. Fifield's backyard. If the bird is on a branch located  $20.0\text{ m}$  from the ground, how much potential energy does it have?  
b.) If a  $6.0\text{ kg}$  scrub jay were sitting on the same branch as the first jay, his  $E_p$  would be:
  - i. The same as the first jay.
  - ii. Two times the  $E_p$  of the first jay.
  - iii. Four times the  $E_p$  of the first jay.
  - iv. One-half the  $E_p$  of the first jay.
- 9.) A squirrel in a nearby tree drops an acorn and just misses Mrs. Sargent's dog, Caesar. If the acorn has  $255.5\text{ J}$  of potential energy and a mass of  $1.0\text{ kg}$ , how high up is the branch from which the acorn fell?
- 10.) A gymnast exercises by jumping on a trampoline. At her highest point she is  $4.3\text{ m}$  off the ground and has a potential energy of  $11466\text{ J}$ . What is the mass of the gymnast?

- 11.) a.) A boy is ready to drop a  $1.6\text{ kg}$  water balloon out of a window onto his sister below. The boy is holding the balloon  $11.3\text{ m}$  off the ground. How much potential energy does the balloon have just before the boy drops it?
- b.) If the boy were holding the same balloon at a height of  $33.9\text{ m}$  off the ground, its  $E_p$  would be:
- The same as the balloon at the lower height.
  - Three times the  $E_p$  of the balloon at the lower height.
  - Nine times the  $E_p$  of the balloon at the lower height.
  - One-third the  $E_p$  of the balloon at the lower height.
- c.) How much potential energy will the balloon have right before it hits the boy's sister? **Explain.**
- 12.) A roller coaster is at the top of a  $72\text{ m}$  hill and weighs  $966\text{ N}$ . The coaster (at this moment) has \_\_\_\_\_ energy. Calculate it.
- 13.) A car is traveling with a velocity of  $40.\frac{\text{m}}{\text{s}}$  and has a mass of  $1120\text{ kg}$ . The car has \_\_\_\_\_ energy. Calculate it.
- 14.) Two objects were lifted by a machine. One object had a mass of  $2.0\text{ kg}$ , and was lifted at a speed of  $2.0\frac{\text{m}}{\text{s}}$ . The other had a mass of  $4.0\text{ kg}$  and was lifted at a speed of  $3.0\frac{\text{m}}{\text{s}}$ .
- Which object had more kinetic energy while it was being lifted?
  - Which object had more potential energy when it was lifted to a distance of  $10.\text{m}$ ? Show your calculation.

### Space Science

- What is the universe and how does this differ from what is called the "observable universe"?
- Explain how the Big Bang theory explains the beginning of the universe.
- What are three proofs that support the Big Bang theory.
- What are three other competing theories and briefly explain how they describe the beginning of the universe.
- What is a colour shift and how does a red shift support the Big bang theory?
- How is the Doppler effect similar to a red shift.
- How can the space between galaxies be expanding at a rate faster than light?
- What is parallax and explain how this can be used to measure "relatively" close distances?
- How do astronomers measure distances to objects that are further than parallax can measure?
- Astronomers use many tools to study space. Choose an astronomical tool and explain what this tool has taught/shown us and explain how this tool is being was/is being used to discern this information.