**Final Review**

**Physical Science – Matter Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Per:\_\_\_\_\_**

1. What system of measurement is used worldwide by scientists?
2. What are the two parts of a measurement?
3. Fill in the following blanks:

1 gram = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ dg

= \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cg

= \_\_\_\_\_\_\_\_\_\_\_\_\_\_ mg

1 kg = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g

1. Convert 3.45 cg to kg.
2. What are significant figures?
3. A physical property can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. A property that can only be observed when a substance changes into another is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Give two examples of a physical change.
6. What are some indicators that a chemical change has occurred?
7. Describe the three subatomic particles in an atom.
8. What is the atomic number represent?
9. What does the mass number represent?
10. What is an isotope?
11. What is the difference between mass number and atomic mass?
12. A common isotope of iron has a mass number of 56. How many protons, electrons, and neutrons does this isotope have?
13. What do the vertical columns on the periodic table represent?
14. What are the horizontal rows called?
15. Where are the metals located on the periodic table? What are some characteristics of metals?
16. Where are the non-metals located? Describe some characteristics of non-metals.
17. What are metalloids?
18. Which groups contain the transition metals?
19. What are valence electrons?
20. How many electrons can occupy the first energy level of an atom? How about the 2nd – 5th levels?
21. What is an ion?
22. For groups 1, 2, 13-18, indicate the number of valence electrons and then indicate the charge of the ions formed from these atoms.
23. Draw energy level diagrams for the atoms and ions that these atoms form.
    1. Sodium
    2. Sulfur
    3. Phosphorus
    4. Barium
24. What group of elements are the least reactive? Why is this?
25. Why do atoms form chemical bonds?
26. Compare and contrast the two types of chemical bonds.
27. Write formulas and names for the following combination of ions.
    1. Ca+2 and Cl-
    2. Na+ and O-2
    3. Al+3 and S-2
28. Given the equation: CH4 + O2 🡪 CO2 + H2O
    1. Identify the reactants and products.
    2. Balance the equation.
    3. Identify the type of reaction.
29. What is the law that states the reason why chemical equations must be balanced?
30. List and describe the five types of chemical reactions.
31. What is a subscript and what does it represent in a chemical formula?
32. What is a coefficient in a chemical equation?
33. How is a nuclear reaction different from a chemical reaction?
34. Complete the following table to compare the types of nuclear decay.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Change in | | | |
|  | Particle  Emitted | Number of  Protons | Number of  Neutrons | Mass  Number | Atomic  Number |
| Alpha  Decay |  |  |  |  |  |
| Beta  Decay |  |  |  |  |  |
| Gamma  Decay |  |  |  |  |  |

1. Define half-life.
2. What isotope is used to determine the age of fossils?
3. Most substances are (more/less) dense in their solid phase than in their liquid phase. Water is a notable exception since solid ice is (more/less) dense than liquid water.
4. What kind of intermolecular attraction exists between water molecules?
5. What does “like dissolves like” mean?
6. What are the two major types of mixtures?
7. Colloids and suspensions are examples of which type of mixture?
8. What are the two parts of a solution?
9. Describe the difference between unsaturated, saturated, and supersaturated solutions.
10. Balance the following equations, then name the reaction type.
    1. \_\_\_\_C3H8 + \_\_\_\_O2 🡪 \_\_\_\_CO2 + \_\_\_\_H2O
    2. \_\_\_\_Li3N + \_\_\_\_NH4NO3 🡪 \_\_\_\_ LiNO3 + \_\_\_\_(NH4)3N
    3. \_\_\_\_H2O 🡪 \_\_\_\_H2 + \_\_\_\_O2
    4. \_\_\_\_Mg + \_\_\_\_Zn(NO3)2 🡪 \_\_\_\_Zn + \_\_\_\_Mg(NO3)2
    5. \_\_\_\_P + \_\_\_\_O2 🡪 \_\_\_\_P2O5
11. Write nuclear equations for the following:
    1. Alpha decay of Uranium-238
    2. Alpha decay of Polonium-218
    3. Beta decay of Carbon-14
    4. Beta decay of Bismuth-214
12. The half-life of Carbon-14 is 5,730 years. How much of a 25 g sample of C-14 remains after 22,920 years?