**Name: Date: LG:**

# **Science 9 Achievement Exam Review**

## ***Unit B: Matter and Chemical Change***

**Knowledge**

* I am able to describe materials in terms of their physical and chemical properties:
  + As a result of investigating different materials, I am be able to describe properties of materials such as melting point, solubility, and conductivity.
  + I am able to classify matter based on their composition and properties. I can demonstrate this by distinguishing between pure substances, solutions, and mechanical mixtures; distinguishing between metals and non-metals.
  + I am able to identify conditions under which properties of a material are changed, and critically evaluate if a new substance has been produced.
* I am able to describe and interpret patterns in a chemical reaction:
  + I can identify and evaluate dangers of caustic materials and potentially explosive reactions.
  + By observing reactions, I can describe evidence of chemical change between familiar materials.
  + I can describe combustion, corrosion, and other reactions involving oxygen.
  + I have observed and can infer evidence of a chemical reaction between familiar household materials.
  + I can distinguish between materials that are very reactive, somewhat reactive, and non-reactive.
  + I have observed patterns of chemical change including:
    - heat being produced (exothermic reactions) or absorbed (endothermic reactions)
    - variables that affect reaction rates such as surface area, concentration, heat, electrical energy).
    - The law of conservation of mass
* I am able to interpret the chemical nature of matter using both past and current ideas.
  + I understand the origins of the periodic table of elements (PTE)
  + I am able to recognize patterns on the PTE that relate to the physical and chemical properties of the elements.
  + I can distinguish between observation and theory.,
  + I can provide examples of how models and theoretical ideas are used in explaining observations
  + I can use the PTE to identify the number or protons, electrons, and neutrons of each atom.
  + I can use the structure of each atom in a group to help explain the properties that those elements have
  + I can distinguish between ionic and molecular compounds
  + I can describe the properties of some common examples of molecular and ionic compounds.
* I am able to use simplified naming rules to describe elements, compounds, and chemical reactions.
  + I can read and interpret chemical formulas for compounds of 2 elements and give the scientific and common name of these compounds.
  + I know the scientific and/or common names for the following compounds: NaCl, CO, CO2, MgO, NH3, CH4, FeCl2, FeCl3, H2O, NaOH.
  + I can use information from a chemical formula or symbol to indicate the ratio/number of atoms per molecule found in some common material. For example, I can identify the number of atoms in a molecule of CO and CO2.
  + I can use ion charge information to predict combining ratios of elements when forming a compound.
  + I can assemble or draw simple models of molecular and ionic compounds.
  + I can describe familiar chemical reactions and represent these reactions by using word equations and chemical formulas.
  + I can describe combustion reactions, corrosion reactions, and replacement reactions.

**Skills**

* I am able to ask questions about the relationships between and among variables, and plan investigations to address those questions.
  + I can identify questions to investigate by properly stating them with manipulated and responding variables.
  + I can state a prediction and a hypothesis based on background information or an observed pattern of events.
  + I can select appropriate methods and tools for collecting data and information. (searching the internet).
* I am able to conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data.
  + I can carry out procedures, controlling the major variables
  + I can observe and record data, and prepare simple drawings
  + I have demonstrated knowledge of WHMIS standards, by using proper techniques for handling and disposing of laboratory materials.
  + I can research information relevant to a given question.
* I am able to analyse qualitative and quantitative data, and develop and assess possible explanations
  + I can compile and display data, by hand or computer, in a variety of formats, including diagrams, flow charts, bar graphs, line graphs, and scatter-plots.
  + I can calculate theoretical values of a variable (for Example, I can use the Law of Conservation of Mass to predict the total mass of the products in a chemical reaction, based on the mass of the reactants)
  + I can identify and suggest explanations for discrepancies in data.
  + I can state a conclusion based on experimental data, and explain how evidence gathered supports or refutes an initial idea.
  + I can identify new questions and problems that arise from something that was learned.

1. Outline the 5 key points to the particle model of matter.
2. How do the properties of particles differ in solids, liquids and gases?
3. Draw a tree map fully representing the classification of matter. Include a short definition under each heading.
4. What are 7 signs that indicate a chemical change may have occurred rather than a physical change?
5. What is the difference between qualitative and quantitative properties?
6. Outline the Law of Conservation of Mass.
7. Outline the Law of Definite Composition.
8. What is electrolysis?
9. Outline the 4 points of Dalton’s Atomic Theory.
10. Briefly outline the contributions of Thomson, Rutherford, Bohr and de Broglie to the development of the atomic model.
11. What is the difference between an element and a compound?
12. What is the difference between a law and a theory?
13. Distinguish between the 3 parts of an atom with regards to location and size.
14. What are metalloids?
15. Outline the key properties of the alkali metals. Give 2 elements in this group.
16. Outline the key properties of the alkaline earth metals. Give 2 elements in this group.
17. Outline the key properties of the noble gases. Give 2 elements in this group.
18. Outline the key properties of the halogens. Give 2 elements in this group.
19. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ developed the modern periodic table.
20. How can you determine the number of protons, electrons and neutrons in an element?
21. Complete the following chart.

**Element Name Symbol # of protons # of electrons # of neutrons**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Neon |  |  |  |  |
|  | F |  |  |  |
|  | C |  |  |  |
| Sodium |  |  |  |  |
| Chlorine |  |  |  |  |

Show how you calculated the 3 of protons, electrons, and neutrons for an atom of Chlorine.

1. What does the “staircase” on the periodic table separate?
2. What do elements in the same group in the periodic table have in common?
3. What do elements in the same period on the periodic table have in common?
4. Distinguish between an ionic compound and a molecular compound according to their properties.
5. State whether the following compounds are molecular or ionic. Then write the names of the compounds.
   1. Fe2O3
   2. ZnS
   3. SO2
   4. NaOH
   5. HCl
   6. NaF
   7. NaCl (state common and scientific name)
   8. CO2
   9. MgO
   10. NH3 (state common and scientific name)
   11. CH4 (state common and scientific name)
   12. FeCl2
   13. FeCl3
6. State whether these compounds are molecular or ionic. Then write the chemical formula for the compounds.
   1. Aluminum (III) Oxide
   2. Sulfur Trioxide
   3. Calcium Chloride
   4. Silver (I) Iodide
   5. Dihydrogen Monoxide
   6. Ammonia
7. What do we mean when we say that an atom of an element forms an ion?
8. How many atoms and molecules are in the following elements/compounds?
   1. O2
   2. C6H12O6
   3. 7H2O
9. What are the reactants in a chemical reaction? The products?
10. What is the difference between a chemical symbol, a chemical formula and a chemical equation?
11. What is the difference between a endothermic and exothermic reaction? Give an example of each.
12. What is a catalyst? An enzyme? An inhibitor?
13. What is corrosion and what are two ways to protect metals from it? What element is always a reactant in a corrosion reaction? What common process is an example of a corrosion reaction taking place?
14. What is combustion? What elements/compounds are always reactants in a combustion reaction? What elements/compounds are always products in a combustion reaction? Give a sample chemical equation for it.
15. Classify the following reactions as corrosion, combustion, or replacement reactions, and then write the chemical equation that corresponds to the word equation.

a) Carbon + Oxygen Carbon Dioxide

b) Iron + Oxygen iron (II) Oxide

c) Zinc + Copper (II)Sulfate Zinc Sulfate + Copper (identify the type of reaction only. You do not need to write a chemical equation for this)