G9 Science: Class 2 Homework

1. Refer to the periodic table to name and write the symbols for the following elements: **[7 marks]**

   a. The halogen of the second period _____

   b. The alkaline earth metal in the fifth period _____

   c. The noble gas with the smallest atomic number _____

   d. The non-metal in the fifth period with seven outermost electrons _____

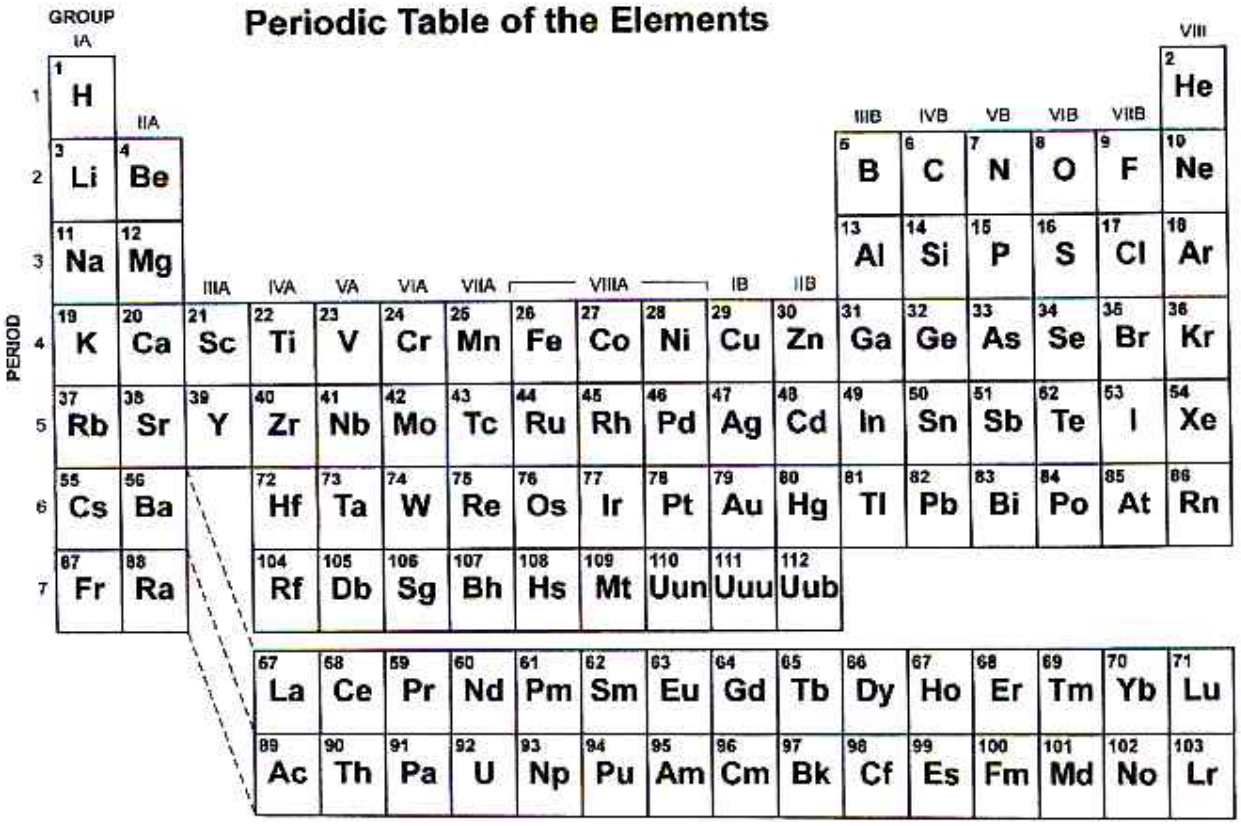
   e. The alkali metal of the fourth period _____

   f. The metal of the third period with three outermost electrons _____

   g. The unreactive gas of the second period _____

2. Colour-code the following periodic table: **[7 marks]**

   a) Alkali Metals - red
   b) Alkaline Earth Metals - green
   c) Transition Metals - blue
   d) Halogens - yellow
   e. Noble Gases - orange
   f. Metalloids - purple
   g. Rare Earth Metals - brown



3. Name the chemical family to which each of the following elements belongs. **[5 marks]**

   a. Chlorine (Cl) _____

   b. Magnesium (Mg) _____

   c. Potassium (K) _____

   d. Helium (He) _____

   e. Iodine (I) _____

4. Complete the following table: **[5 marks]**

Element Name	Element Symbol	Atomic Number	Mass Number	Number of Protons	Number of Neutrons	Number of Electrons
Magnesium						
	Al					
		15				
				50		
						47

5. Explain the difference between the terms in each pair below: **[8 marks]**

   a. Group vs. Period

   b. Proton vs. Neutron

   c. Atomic Mass vs. Mass Number

   d. Isotope vs. Ions

6. Using your notes, list the date and main findings for each of the following scientists: **[6 marks]**

Scientist	Date	Main Concept
Democritis		
Dalton		
Thomson		
Rutherford		
Chadwick		
Bohr		

7. Draw the following Bohr-Rutherford Diagrams: **[16 marks]**

a) Carbon

c) Sulphur

b) Magnesium

d) Neon

Challenge Problems

8. Draw Bohr-Rutherford diagrams for the first three elements in the alkali metals. Describe any identifiable patterns that emerge as you go down the family. **[5 marks]**

9. Draw Bohr-Rutherford diagrams for the most common isotope of all the elements in Period 2. Describe any identifiable patterns that emerge as you go across a period. **[9 marks]**

10. Which of the following Group 17 elements would you predict to be the most reactive: chlorine, fluorine, or bromine? Explain your choice based on the arrangement of the element's electrons. **[3 marks]**

11. In the past, some airships were filled with hydrogen because hydrogen is less dense than air. An airship filled with hydrogen will rise up and easily float through the air. Now airships are filled with helium, which is also less dense than air. Based on their positions on the periodic table, why is helium a better choice than hydrogen to use in airships? **[3 marks]**

12. The mass number of a certain element is 195. The most common isotope of that element has 117 neutrons in each of its atoms. How many protons does an atom of this element contain? Identify the element. **[3 marks]**

13. Identify two elements from each family below and identify their common uses: **[8 marks]**

    a) Alkali Metals

    b) Alkaline Earth Metals

    c) Halogens

    d) Noble Gases

14. Draw Bohr-Rutherford Diagrams for the first three elements in the noble gases family and explain why the elements in the noble gases family are unreactive. **[4 marks]**

15. Do all the atoms of the same element contain the same number of protons? Explain. **[2 marks]**

16. Do all the atoms of the same element contain the same number of neutrons? Explain. **[3 marks]**

17. Do all the atoms of the same element contain the same number of electrons? Explain? **[3 marks]**

18. "It's all about the electrons". This statement is used to explain how elements in the same family have similar properties. Explain how this statement is true by using one group as an example. **[3 marks]**

19. For Rutherford's Gold Foil Experiment, what did Rutherford predict to see before the experiment? What was most surprising result after Rutherford conducted the experiment and what did he conclude from the results of the experiment? **[4 marks]**

20. Three different solids, A, B, and C, each with a metallic lustre, were combined individually with water and with an acid. The following observations were made:

Solid	Reaction with Water	Reaction with Acid
A	No Change	Bubbled Slightly
B	No Change	No Change
C	Bubbled Slightly	Bubbled Vigorously

a) Which solid was the most reactive? **[1 mark]**

b) Which solid was the least reactive? **[1 mark]**

c) If these solids belong to the same chemical family, which solid would you place highest in the column? Which would you place the lowest? **[2 marks]**

d) Imagine another solid X, which is correctly placed between the top two most reactive solids in your answer to (c). Predict how solid X would react with water and with acid. Give reasons for your answer. **[3 marks]**