NAME:_____DATE:_____CLASS_____SUMMER

I Like Your Name… Can I Get Your Number?

Big Idea 1:

The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.

Enduring understanding 1.A:

All matter is made of atoms. There are a limited number of types of atoms; these are the elements.

Reading Standard:

RST4: Determine the meaning of symbols, key terms, and other domain specific words and phrases as they are used in specific scientific or technical context.

Writing Standard:

WHST2 a: Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions.

Background:

Although some elements, such as gold and iron, have been known to humans since prehistoric times, it wasn't until the 17th century that the first scientific discovery of an element (phosphorus) was made. Only 12 elements were known prior to 1700, but as more and more elements were discovered—by 1900 there were more than 80—scientists tried to find a way to organize them systematically, according to their physical and chemical properties.
Today, the periodic table organizes the elements in horizontal rows, or periods, by order of increasing atomic number, which equals the number of protons in the atomic nucleus of each element. The elements are also organized in vertical columns, or groups, based on similar physical characteristics and chemical behavior. This arrangement developed side by side with atomic theory over about 200 years, and it continues to evolve as new elements are discovered.

The Russian chemist Dmitri Mendeleev, who is generally acknowledged as the “father” of the modern periodic table, set the biggest milestone in the development of the periodic table. Mendeleev wrote out the names of the elements, along with their atomic weights and other properties, on cards, which he then laid out in rows and columns much like a game of solitaire. When the elements were ordered according to atomic weight, Mendeleev could see that certain chemical properties were repeated periodically; however, not all the elements fit this pattern neatly. Mendeleev's solution was to move certain elements to new positions, despite their accepted weight, in order to group them with other elements sharing similar properties. (Nearly half a century later, after the periodic table was revised according to atomic number rather than atomic weight, these elements fell into place.)

Mendeleev's work on periodic law—which states that the properties of elements recur periodically as their atomic weights increase—was announced in 1869. At about the same time, a German chemist named Julius Lothar Meyer independently arrived at a periodic table that was remarkably similar to Mendeleev's. Unfortunately for Meyer, Mendeleev presented his work to the scientific community first. However, Mendeleev's table was also superior to Meyer's because he left a number of empty spaces to account for elements that were yet to be discovered.

PROJECT:

Use: www.wikipedia.com to research the following questions.

Search for: Mendeleev

1) Describe the basis of the reason Mendeleev was given credit for the development of the periodic table over Meyer. Support your answer with specific details and element names from the text.

The periodic table is composed of 3 general classes of matter: metals, non-metals and metalloids.

Search for: non-metals

2) Describe the general properties of non-metals. Highlight in a unique color, the 18 elements on the periodic table, which are classified as non-metals.

3) Of the 18 elements, which are classified as non-metals 11 are found, in the gas phase at standard temperature and pressure (STP). Indicate these 11 gases on your periodic table by placing a small “g” in each gaseous elements box. One of the non-metals is found in the liquid phase at STP. Indicate this 1 liquid on your periodic table by placing a small “l” in the element’s box. The remaining non-metals are in the solid phase at STP. Indicate this by placing a small “s” in the element’s box.

Search for: standard temperature and pressure

4) Define standard temperature and pressure and indicate why it used in chemistry.

Search for: metalloids

5) Describe the general properties of metalloids. Highlight in a unique color, the 6 elements on the periodic table, which are classified as non-metals. Indicate metalloid's phase by placing the correct symbol in the element's box.

Search for: metals

6) Describe the general properties of metals. Highlight in a unique color, all the metallic elements on the periodic table, which are classified as non-metals. Indicate each metal's phase by placing the correct symbol in the element's box.

7) Create a key on your periodic table for each class of element.

Search for: periodic table groups

8) Mendeleev arranged the elements in columns called groups. Describe the chemical basis for Mendeleev's placement of elements in a specific group.

9) Many groups have specific names. On your periodic table indicate the specific names of groups: 1, 2, 15, 16, 17 and 18.

Chemistry is the study of matter and its properties. In-depth knowledge of the elements on the periodic table is required for a deeper understanding of chemistry.

Search for: copper

10) Many elements on the periodic table have names and symbols, which don't match. Copper is one of these elements. Give coppers symbol and describe its derivation.

11) Copper is a metal, which has been in use for centuries in alloys. Define an alloy and describe how copper alloys were used in ancient times.

12) Copper it self has a unique color, as does its compounds. Describe the color of the element copper and the common color of its compounds. Describe how copper and its colored compounds have been used.

Search for: chlorine

13) Describe chlorine's color and phase.

14) Chlorine is normally found as a diatomic molecule. Define the term diatomic and determine which other elements can be found as diatoms.

15) When chlorine forms an ionic compound it has a characteristic charge. Determine this ion's charge and determine the name given to this ion.

Search for: polyatomic ion

16) Many compounds occur when a polyatomic ion is involved in an ionic bond. Define a polyatomic ion.

17) Chlorine can make several common polyatomic ions: hypochlorite, chlorite, chlorate, and perchlorate. Give the formulas and charges on each of these polyatomic ions. Which of the above polyatomic ions are found in household bleach NaClO.

Study and be able to identify the names of the elements, their ionic charges, the common polyatomic ions and their charges.