

Chemistry I Honors
Science FCAT Review for Grade 11
-Nature of Matter
Topic-Nature of Matter

- **Annually Assessed Benchmarks: Elements are arranged into groups (or families) based on similarities in electron structure. Elements' physical and chemical properties can be predicted**
- **What could be stated and assessed?**
 - 1) **Chemical and physical similarities and differences between elements**
 - 2) **How location on periodic table affects properties of elements**
- **What skills are needed?**
 - 1) **Comparing and contrasting**
 - 2) **Identifying groups and rows on the periodic table**
- **What vocabulary must be understood?**
Periodic table, group (family), row (period), electron configuration (structure), valence electrons (outer shell electrons), charge on an atom

For You to Read

In 1888, the British physicist Lord Rayleigh and Scottish chemist William Ramsay were sure that they had discovered a new element—a strange gas. But this created a problem. Their calculations indicated that argon had an atomic mass of about 40. However, as appeared in 1894, the periodic table had no space for such an element. The elements with atomic masses closest to that of argon were chlorine and potassium. Unfortunately, the chemical properties of the families of each of these elements were completely dissimilar to those of the strange gas.

Ramsay contemplated argon's lack of reactivity. He knew that Mendeleev had created the periodic table on the basis of valence, or the number of atomic partners an element bonds with in forming a compound. Because Ramsay could not cause argon to form any compounds, he assigned it a valence of zero. And because the valence of the elements in the families of both chlorine and potassium was one, perhaps argon fit in between them.

Ramsay's insight that argon merited a new spot between the halogen family and the alkali metal family on the periodic table was correct. And as Ramsay would soon confirm, his newly discovered gas was indeed one of a previously unknown family of elements.

In 1895, Ramsay isolated a light, inert gas from a mineral called cleveite. Physical analysis revealed that the gas was the same as one that had been identified in the sun in 1868—helium. Helium was the second zero-valent element found on Earth, and its discovery made chemists aware that the periodic table had missing a whole column of elements—noble gases in Group 18 in modern periodic table. Over the next three years, Ramsay and his assistant identified three more inert gases present in the atmosphere: neon (Greek for “new”), krypton (“hidden”) and xenon (“stranger”). For his discovery, Ramsay received the Nobel Prize in 1904.

Questions and Assessment

Students work on the following worksheets and answer the questions, and take the exit assessment if it is required by the review activity

Computer-Enhanced Instruction Delivery
-Periodic Table Lesson and Lab

I. Complete the following Periodic Table Graphic Organizer by using your knowledge of the Periodic Table. Briefly define the concepts and connect them according to their relationships by using lines

Group

Elements

Period

Compounds

Atom

Covalent bonds

Ion

Ionic bonds

Periodic Table

Valence Electrons

Noble gas

Metals

Alkali metals

Nonmetals

Halogen

Metalloids

Isotopes

II. Answer the following questions

1. What is an atom? _____

2. What is an element? _____

3. What is a compound? _____

4. What particle travels around the nucleus of an atom? _____

5. What is the electrical charge of the particle given in Question 4? _____

6. What is a mixture? _____

7. How do the alkali metals react with water?

8. Do they all react the same? Why or why not?

9. What does reactivity mean when used with elements and compounds?

9. Complete the chart below showing the number of protons, neutrons, and electrons in the atoms or ions shown

Atom or Ion	Protons	Neutrons	Electrons	Overall charge on atom or ion
Nitrogen (N)				
Potassium (K)				
Oxygen (O)				
Calcium ion (Ca^{2+})				
Chlorine ion (Cl^-)				

10. Can distilled water or pure water conduct electricity? Why or why not?