GCS Unit Plan Template

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Unit Overview

Unit Title **Periodic Table and Trends** **Unit 2**

Unit Summary

Students will about the development of the periodic table. They will become knowledgeable of the trends that exist on the chart and understand why it is still important to create new elements.

Subject Area

Chemistry

Grade Level

10-12

Approximate Time Needed

9 x 90 minutes class periods

Unit Foundation

Targeted Content Standards and Benchmarks

1.3.1 Classify the components of a periodic table.
1.3.2 Infer physical properties of an elements based on its position on the Periodic Table.
1.3.3 Infer atomic size, reactivity, electronegativity, ionization energy of an element from its position on the Periodic Table

Student Objectives/Learning Outcomes

Chm.1.3.1 Classify the components of a periodic table(Period, group, metal, metalloid, nonmetal, transition).

Groups (families)

• Identify groups as vertical columns on the periodic table.
• Know that main group elements in the same group have similar properties, the same number of valence electrons, and the same oxidation number.
• Summarize that reactivity increases as you go down within a group for metals and decreases for nonmetals.

Periods

• Identify periods as horizontal rows on the periodic table.

Metals/Nonmetals/Metalloids

• Identify regions of the periodic table where metals, nonmetals, and metalloids are located.

Classify elements as metals/nonmetals/metalloids based on location.

Representative elements (main group) and transition elements
• Identify representative (main group) elements as A groups or as groups 1, 2, 13-18.
• Identify alkali metals, alkaline earth metals, halogens, and noble gases based on location on periodic table.
• Identify transition elements as B groups or as groups 3-12.

Chm.1.3.2 Infer the physical properties (atomic radius, metallic and nonmetallic characteristics) of an element based on its position on the Periodic Table.
Classify elements as metals/nonmetals/metalloids based on location.
Representative elements (main group) and transition elements
• Identify representative (main group) elements as A groups or as groups 1, 2, 13-18.
• Identify alkali metals, alkaline earth metals, halogens, and noble gases based on location on periodic table.
• Identify transition elements as B groups or as groups 3-12.
Electron configurations/valence electrons/ionization energy/electronegativity
- Write electron configurations, including noble gas abbreviations (no exceptions to the general rules). Included here are extended arrangements showing electrons in orbitals.
- Identify s, p, d, and f blocks on Periodic Table.
- Identify an element based on its electron configuration. (Students should be able to identify elements which follow the general rules, not necessarily those which are exceptions.)
- Determine the number of valence electrons from electron configurations.
- Predict the number of electrons lost or gained and the oxidation number based on the electron configuration of an atom.
- Define ionization energy and know group and period general trends for ionization energy. Explain the reasoning behind the trend.
- Apply trends to arrange elements in order of increasing or decreasing ionization energy.

Define electronegativity and know group and period general trends for electronegativity. Explain the reasoning behind the trend.
• Apply trends to arrange elements in order of increasing or decreasing electronegativity

Chm.1.3.3 Infer the atomic size, reactivity, electronegativity, and ionization energy of an element from its position on the Periodic Table.

Cross-Curricular Connections

Curriculum-Framing Questions

Essential Question	Why is organization important in science just as it is in life? Why do scientists continue to create new elements? Why do you think the chart that contains the elements is called a "periodic" chart or table?
Unit Questions	Why has the arrangement of the periodic remained relatively unchanged for the past 200 years? Why was Mendeleev's periodic table accepted over that of Lothar Meyer? What is a trend? What can the periodic table tell us about the general trends of atomic size, ionization energy, electron affinity, and electronegativity?

Content Questions	What is a "rule of thumb"? What is the definition of ionization energy and what affects does it have on the behavior of an atom and it properties? What is the definition of electron affinity and what affects does it have on the behavior of an atom and it properties? What is the definition of electronegativty and what affects does it have on the behavior of an atom and it properties? How are metals and nonmetal different? What is a period as it relates to the periodic table? What is true of elements in a column i.e. group or family on the periodic table? What is an electron configuration and how do they help us understand the behavior of atoms?

Assessment Plan

Unit Details

Prerequisite Skills

Basic understanding of the use of the periodic chart. Differences between metals and nonmetals.

Instructional Procedures

Days 1 & 2

History of the periodic table (http://www.pbs.org/wgbh/nova/education/physics/developing-periodic-table.html)
Metal v. Nonmetals v. Semimetals
Families and other areas on the chart (http://edutube.org/en/video/brainiac-alkali-metals)
Video on The Periodic Table

Day 3-5

Periodic Trends
-atomic radius -ionization energy
-ionic radius *honors compare 1st i.e. to 2nd*
-electronegativity *understand electron affinity*

Days 6-8

Quantum Numbers Color chart
1- principle Learn to write configurations
2-sublevels 4- spin
3- orbital
Groups activity on quantum numbers

Day 9

Unit Test

Accommodations for Differentiated Instruction

Special Needs Students/ Nonnative Speakers	Preferred grouping, modified assignments, graphic organizers, enhanced technology (including translation software), acknowledgement of contributions of persons from various countries/nationalities
Gifted/Talented Students	Drawing Lewis structures for elements

Materials and Resources Required For Unit

Technology – Hardware (Click boxes of all equipment needed)

X Interactive Technology	X Student Response System/Clickers	X Cell Phone
☐ Computer(s)/iPads, etc.	☐ Printer	☐ Video Camera
☐ Digital Camera	X Projection System	☐ Video Conferencing Equip.
X DVD Player	☐ Scanner	☐ Document Camera
X Internet	X Television	☐ Other

Technology – Software (Click boxes of all software needed.)

☐ Database/Spreadsheet	☐ Image Processing	☐ Web Page Development
☐ Desktop Publishing	☐ Internet Web Browser	X Word Processing
☐ E-mail	X Multimedia	☐ Other
X Web-Based Encyclopedia		

Printed Materials	Merrill & Prentice Hall Chemistry text *Current Science* Worksheets Merrill and Prentice Hall Chemistry Reference packet Modified periodic table
Supplies	*Current Science* on line

Additional Unit Plan Information

Internet and Additional Resources

List additional resources for the lesson/unit plan or related lesson plans that map to the Common Core Standards in the lesson/unit plan.

Common Core Standard	Resource

Unit Plan Reflection

Describe any adaptations or "tweaks" to the resource or lesson plan that were needed:

No tweaks were needed. This unit went smoothly and according to schedule.

What do you plan to do differently the next time you teach this unit?:

The unit went well. Next time I will assign the element project to regular Chemistry. I did not assign it this semester because I was trying to get back on schedule.