

General Chemistry
Periodic Table Unit
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Time: 1 day to 5 days depending on the amount of time allotted and the detail desired.

Objectives: Students will be able to visualize the periodic table groupings.
Students will understand the periodic trends.
Students will relate periodic trends to reactivity.
Students will be able to predict an element's characteristics based on the trends.
Students will relate electron configuration to grouping of the periodic table and valence
Electrons

By this point students should understand the model of the atom and subatomic particles. They may have already done electron configurations or electron configurations can be introduced at this point.

Day 1 – Students need to gain an appreciation for the organization of the periodic table. There are many places to begin. However, it seems to work best starting with the history. Day one is used to bring the students through time from the first periodic table to the modern periodic table. Include brief biographies on Mendeleev and Mosely and their work in developing the periodic table.

Activity – Give students pretend elements A through S and their general properties. Have students work in groups of two to design their own periodic table. Have students display their periodic table and explain why they grouped elements as they did. Remind students what technology Mendeleev had to work with during the 1800's.

Optical assignment – Internet research on Mendeleev or Mosely, picture of the original periodic table that still stands in Russia.

Day 2 – The first grouping – s, p, d, and f block.
Using a discussion type format, work students through the s, p, d and f blocks of the periodic table. Relate this back to what they have learned about electron configurations and valence shell electrons.

Activity – Orally ask students to identify an element as in s, p, d or f block and then have them write out the electron configuration.

Day 3 and 4 – A few trends – electronegativity, first ionization energy, atomic radii, and ionic radii. First define the terms for the students. Use homemade clay models to illustrate the concepts. Work students through the trends and explain WHY these occur. Students must understand why or they won't be able to remember the trend.

Activity – Pop Quiz – giving students two elements and asking which has a larger atomic radii? Which has a smaller ionic radii? Which is more electronegative? Which is more likely to lose an electron?

Day 5 – Bringing it all together
Refer to a Periodic Chart of the Elements table

Periodic Table Tricks

Purpose: To teach students how to view the periodic table
To demonstrate the information obtained from the table's organization

Materials: 7 black and white periodic tables per student (you can use blank ones if available)
Colored pencils

Procedure:

Have each student color code and shade the charts according to the following breakdown.

1st chart Metals, Nonmetals, Metalloids

2nd chart s, p, d and f block (cut this one apart and tape back together on a legal size sheet of paper)

3rd chart shade for trend in ionization energy (use all one color – darker where more energy is released and lighter where more energy is required)

4th chart shade for trend in atomic radii (darker where larger radii and lighter for smaller radii)

5th chart shade for trend in ionic radii (darker where larger radii and lighter for smaller radii, use one color for cationic radii and one color for anionic radii)

6th chart shade for trend in electronegativity (fluorine being the darkest for most electronegative)

7th chart color code for families

Add more charts as they apply

Daily quizzes

Traditional Exam

Characterizing an element – Have students choose an element and work through all the trends, electron configurations, characteristics based on placement in the periodic table, etc. I have students keep this element throughout the year and we work problems with it, etc.

Graphing trends – have students graph the trends on their graphing calculator and print them out OR hand drawn on graph paper.