

I. ASSIGNMENT

- A. Read and study all of chapter 14
- B. Do all of the review and practice problems within the reading.
- C. Do the following problems on pages 384-387: 3, 4, 7, 8, 9, 12, 14, 15, 16, 19, 21, 22, 28, 29, 30, 31, 35, 37, 38, 39, 48, 51

II. UNIT OBJECTIVES After you have completed this unit you should be able to:

1. Describe the origin of the periodic table.
2. State the periodic law.
3. Explain the relationship between electron configurations and the locations of the elements in the periodic table.
4. Describe the nature of periods and groups of elements in the periodic table.
5. State the definitions of some properties of the elements that exhibit periodicity and describe the trends of those properties within periods and groups of elements.
6. Be able to explain band theory, metallic bonding, and metallic properties, especially conductivity.
7. Describe the structure and composition of solid solutions.
8. Describe semiconductors, p-n junctions, biasing, and LEDs.
9. Explain how LEDs work.
10. Understand the relationships between energy bands, energy gaps, properties of light, and how they relate to periodicity.
11. Explain what AZ stoichiometry (zinc blende structure) is and why it is useful.
12. Describe the uses and capabilities of LEDs.

III. SCHEDULE OF CLASSROOM ACTIVITIES:

1. Read sections 14-1 through 14-4. A video program will provide a connection between the rather abstract quantum theory of the last chapter and the very practical periodic table of this chapter.
2. Do experiment 14-1 “Periodicity of Physical, Chemical, and Atomic Properties.” This lab should give you a good understanding of some of the data that was used by Mendeleev

and others to organize the elements into the modern version of the periodic table.

3. Finish lab, discuss, and complete questions from lab.
4. Discuss Band Theory. Do Demonstration 1 “Electrical Conductivity with a Bottle.”
5. Investigation 1: “Building Graphite”
6. Discuss Investigation 1 and complete Demonstration 2: “Increasing Conductivity by Adding Electrons.”
7. Investigation 2: “The Zinc Blende Structure: AZ Stoichiometry.”
8. Discuss zinc blende structures and solid solutions in conjunction with periodicity.
9. Read sections 14.5 through 14-10. A worksheet will be passed out to allow you to practice your understanding of these periodic trends.
10. Discuss semimetals, including their properties, n-type and p-type semiconductors, biasing, and p-n junctions.
11. Demonstration 3: “LEDs-The Electronic Properties of a p-n Junction.” Discuss LEDs.
12. Continue LED discussion. Complete Demonstration 4: “Different Color LEDs.” Demo. 4 Wkst. handed out.
13. Experiment 1: Properties of Light and LEDs.
14. Discuss Demo. 4 Wkst. and Exp’t. 1 results. We will discuss isoelectronic principles related to Group IVA with an emphasis on the solid solution series for LEDs. LED uses and capabilities will be explained.
15. Unit Review: LED questions, ChemMedia Activity 2D “The Periodic Table,” and end of the chapter questions.
16. Unit Test