

I. ASSIGNMENTS

- A. Read and study all of chapter 11.
- B. Do all the Review and Practice problems within the reading.
- C. Do the following problems on pages 292-295: 2, 5, 7, 12, 13, 14, 18, 19, 21, 27, 35, 37, 39, 43, 46, 48, 51, 53, 54, 55, 56, 58, 66, and 68.

II. UNIT OBJECTIVES

See page 259 of the text and

1. Explain what X-ray diffraction is.
2. Describe how X-ray diffraction can be used to provide evidence for the existence of atoms.
3. Predict the X-ray diffraction pattern by looking at a slide-“Reciprocal Lattice Effect.”
4. Describe crystal structures.
5. Describe the structure of crystalline solids in terms of unit cells.
6. Describe and explain the unique features of memory metals.
7. Explain phases and phase changes in terms of temperature and pressure.
8. Understand and explain phase diagrams.
9. Complete some research, which will illustrate that these topics have applications (outside of science class) that influence our quality of life.

III. SCHEDULE OF CLASSROOM ACTIVITIES

1. Read sections 11-1 through 11-4. Much of this material is a review. Several demonstrations will be done to illustrate important concepts. A review activity on manometers will be handed out and discussed.
2. Read sections 11-5 through 11-7. Heating curves will be emphasized and another review sheet will be distributed. Laser disc demonstrations, the concept of boiling, and a room temperature boiling demonstration will be presented.
3. Read sections 11-8 through 11-13. Demonstrate and discuss evaporation. The phase diagram for water will be discussed and compared with that of carbon dioxide. Another review sheet will be distributed and should be completed for the next day.
4. Read sections 11-14 through 11-20. The Kinetic Molecular theory will be reviewed and demonstrated. Various types of solids will be discussed, and a practice phase diagram problem will be given.

5. Review the nature of light and its properties, particularly reflection, interference, and diffraction. Interference demonstrations will be performed and diffraction will be discussed. An ordinary diffraction grating and various light sources will help with your understanding. Pre-lab Investigation 1, "Diffraction Patterns."
6. Investigation 1, "Diffraction Patterns."
7. Discuss results of Investigation 1, and demonstrate the Unit Cell and VSEPR Diffraction Patterns.
8. Quiz on first part of chapter
9. Discuss crystal structures and unit cells.
10. Do investigation 2, "The Packing of Atoms in Crystals."
11. Discuss Investigation 2. Investigation 2 is due at the end of the hour.
12. Do Investigation 3, "Teaching the Wire a New Shape?" and Investigation 4, "Mechanical Properties of Austenite and Martensite."
13. Discuss Investigations 3 & 4. An in class discussion question will be presented.
14. Do Investigation 5, "Acoustic Properties of Two Alloys."
15. Discuss Investigation 5 and pre-lab Experiment 1, "Determination of the Transition Temperature of NiTi." **An approved procedure is required before you begin.**
16. Complete Experiment 1.
17. Experiment 1 due. Discuss the capabilities and uses of memory metals. An in-class discussion question will be presented, and time to work on it provided. This will be followed by a discussion period.
18. Chemedia 5b: Kinetic Energy Simulations
19. Begin Activity 1, "Research."
20. Complete library research. Hand in activity and article tomorrow.
21. Go through library topics and review for test.
22. Test