

CHEMISTRY II

LENGTH OF TIME: 90 minutes daily for one semester

GRADE LEVEL: 11-12

COURSE STANDARDS:

Students will:

1. Explain oxidation/reduction and its quantitative importance. (PA Std 3.4b)
2. Perform lab preparations of various compounds. (PA Std 3.1, 3.2, 3.4a, 3.4b)
3. Summarize the mechanics of chemical reactions. (PA Std 3.4a)
4. Manipulate chemical apparatus in the laboratory. (Std 3.1, 3.2)
5. Describe the various applications of chemical equilibrium. (PA Std 3.4a, 3.4b)
6. Describe atomic and molecular structure on both the qualitative and quantitative levels. (PA Std 3.4a)
7. Evaluate the environmental impact of various chemical industries. (PA Std 3.2, 3.8, 4.2)
8. Explore the laws of thermodynamics and their applications to real life. (PA Std 3.2, 3.4b, 3.8)

RELATED PA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY

- 3.1 Unifying Themes
 - A. Systems
 - B. Models
 - C. Patterns
 - D. Scale
 - E. Change
- 3.2 Inquiry and Design
 - A. Nature of Scientific Knowledge
 - B. Process Knowledge
 - C. Scientific Method
 - D. Problem Solving in Technology
- 3.4 Physical Science, Chemistry and Physics
 - A. Matter
 - B. Energy
- 3.8 Science, Technology and Human Endeavors
 - A. Constraints
 - B. Meeting Human Needs
 - C. Consequences and Impacts

RELATED PA ACADEMIC STANDARDS FOR ENVIRONMENT AND ECOLOGY

- 4.2 Renewable and Nonrenewable Resources
 - A. Uses
 - B. Availability

- C. Management
- D. Influential Factors

PERFORMANCE ASSESSMENTS:

Students will demonstrate achievement of the standards by:

1. Performing various redox reactions and relate them to atomic structure. (Course Standard 1,4)
2. Determining the reaction rate constant/reaction order. (Course Standard 2, 3, 4)
3. Maintaining a daily journal of class information. (Course Standard 1-8)
4. Drawing diagrams/constructing electrochemical cells. (Course Standard 1, 3, 4)
5. Solving equilibrium problems. (Course Standard 3)
6. Constructing computer-generated/ball-and-stick molecular models. (Course Standard 6)
7. Equilibrium constant determination/application. (Course Standard 3, 4, 5)
8. Drawing diagrams of molecules/chemical reactions. (Course Standard 3, 6)
9. Researching, designing and producing posters for use in the chemical laboratory. (Course Standard 1, 5, 6, 7, 8)
10. Performing standardizations of solutions. (Course Standard 2, 4)
11. Applying thermochemistry concepts to food and nutrition. (Course Standard 8)
12. Explain/hypothesize how a demonstration works. (Course Standard 1, 5, 6, 7, 8)
13. Researching, designing, and producing a report evaluating various environmental pollutants. (Course Standard 3, 7)
14. Formulate a Raku glaze using various chemistry principles and organize a firing ceremony to fire the pottery on which the glaze was used. (Course Standard 1, 2, 3, 4, 5, 6, 8)
15. Researching and producing a report evaluating the effects of over-the-counter drugs. (Course Standard 7)

DESCRIPTION OF COURSE:

The objective of Chemistry II is to help students develop a greater understanding and appreciation of chemical principles. Chemistry II will help to prepare students for college science courses by giving them a solid background in problem solving, analytical and critical thinking. Activities may include model building, analysis of solutions, titrations, reaction kinetics, varied chemical reactions and sessions in advanced problem solving.

TITLES OF UNITS:

- | | |
|-------------------------------|---------|
| 1. Atomic/Molecular Structure | 2 weeks |
| 2. Oxidation/Reduction | 2 weeks |
| 3. Stoichiometry | 1 week |
| 4. Equilibrium | 4 weeks |
| 5. Environmental Chemistry | 2 weeks |
| 6. Spectrophotometry | 2 weeks |
| 7. Thermochemistry | 2 weeks |
| 8. Kinetics | 2 weeks |

SAMPLE INSTRUCTIONAL STRATEGIES:

1. Cooperative learning groups
2. Problem solving activities
3. Small group activities
4. Individual activities
5. Process writing
6. Lecture and demonstration
7. Multimedia presentations
8. Simulations of chemical reactions
9. Model construction
10. Laboratory activities
11. Technology assisted learning
12. Research activities
13. Student created flow charts/concept maps/posters

MATERIALS:

1. Text: Chemistry: The Central Science Text; Brown, Bursten, and Lemay; 8th edition, Prentice Hall, 2001
2. Computers and appropriate software
3. Selected audio and video materials
4. Laboratory instruments
5. Various chemical tables
6. Chemicals/glassware/equipment
7. Art supplies

METHODS OF ASSISTANCE AND ENRICHMENT:

1. Opportunities for retesting
2. Tutorial opportunities
3. Pretests and test previews
4. Extra credit opportunities
5. Study guides/work sheets
6. Collaborative assessment opportunities
7. Alternative modes of assessment
8. Resource room
9. Web page

PORTFOLIO DEVELOPMENT:

In order to document achievement and show evidence of improvement in science, students may include selections from the following in their portfolios:

1. Lab reports
2. Scientific writing
3. Tests/quizzes
4. Drawings/models
5. Graphic organizers
6. Group technology research projects

METHODS OF EVALUATION:

1. Tests and quizzes
2. Homework
3. Oral presentations
4. Laboratory reports
5. Research papers
6. Group and individual projects

INTEGRATED ACTIVITIES:

1. Concepts
 - vocabulary definition and use
 - discussions
 - use of technology
2. Communication
 - reading and discussing
 - writing for a variety of purposes
 - responding orally and in writing
 - listening and understanding oral messages
3. Thinking/Problem Solving
 - drawing conclusions
 - inferring meanings from text
4. Application of Knowledge
 - computer aided research
 - use of laboratory instruments
 - molecular model construction
5. Interpersonal Skills
 - enrichment – reading various related material
 - remediation – conferencing