Purposes or Objectives of the Course

This course will provide a fundamental background in chemistry for those wishing to be effective teachers, curriculum designers and science coordinators. Another purpose of this course is to strengthen the chemistry knowledge of teachers who are certified in areas other than chemistry. Students will be introduced to a variety of teaching strategies while they are involved in ‘learning by doing’ experiences in the classroom. Students will subsequently apply the instructional methods modeled in this course to their own settings by developing appropriate lesson plans to teach a selected topic and/or to develop a needed curriculum. The content covered in this course reflects the current needs for chemistry education as reflected in the National Standards and the Missouri Frameworks.

Expectations of Students

1. Students are expected to read and complete assignments made.
2. Students will engage actively in classroom activities designed to develop scientific concepts.
3. Students will complete an outside project related to teaching chemistry. This will entail a Concept Activity plan for the development of a specific topic.
4. Students will successfully complete a final exam.

Course Content or Outline

Date

6/13 Tues

Introduction
An overview of the design of the course; student expectations; description of project specifics; chemistry as a discipline; basic mathematical review.

Assignment for Wednesday 6/16: assigned reports; Reading: Ch. on mathematics and density.

Internet assignment for Wednesday: Bring an activity introducing measurements to a particular grade level to bring to class; describe how you would change this activity to teach at a lower and a higher-grade level.

Physical Properties of Matter
Intrinsic/extrinsic properties; density. Students will work on the activities and follow up with group work.

Reading: chapters on properties of matter, atomic structure and the Periodic Table.

Assignment for Wednesday, 6/16: Draft initial ideas for project; prepare a 5-minute report on your assigned atomic theory.

Internet Assignment for Friday 6/18: Lake Nyos

6/14 Weds

Matter, The Periodic Table & Atomic Structure
Discuss ideas for project. Classifications of matter; periodic trends and useful information from the Periodic Chart, relating the chart to atomic structure, and using the information about atoms to generate simple formulas. Work will include analyzing interactive periodic charts.

Chemical Equations
An overview of word equations, balancing equations, the mole, and mathematical relationships found in equations.

Reading: Chapter on chemical equations and reactions.
Internet Assignment for Friday 6/18: Find and describe a hands-on activity that you could use to introduce parts of the atom, Octet Rule, or ionic formulas. Atomic Book Assignment.

Internet Assignment for Tuesday 6/22: Mole Day Assignment

6/16 Chemical Reactions
Fri
Homework discussion & sharing of internet finds; exploration of how chemists distinguish chemical changes from physical changes; types of reactions.

Assignment for Tuesday 6/22: Prepare a short oral report on your project.

6/20 Chemical Reactions (cont.)
Tuesday
Discuss Mole Day Activities. Introduction to rates and equilibrium. Students will work on in-class activities.

Assignment for Wednesday 6/23: Find real-world applications of rates and energetics of reactions – show how you would incorporate this into your class by preparing a homework assignment for your students using this idea. Include the key and grading scheme.

6/21 Matter & Molecules
Weds
Oral reports on assignment. Exothermic/endothermic processes; properties of substances such as polarity, surface tension, and miscibility will be covered. Work in class.

Assignment for Friday 6/25: Read chapter on polymers.

Internet Assignment: Find an activity introducing one of the concepts covered to a particular grade level; bring to class along with your comments.

6/23 Polymers
Friday
Student modeling activities will introduce the concepts of monomers, initiators, polymers, and cross-linking; these are followed by activities showing properties of polymers.

Reading: chapter on acids and bases.

Assignment for Tuesday 6/29: HW assignment on polymers; Scavenger hunt for polymers...bring results of scavenger hunt and your impressions in written form to class. Bring your shrunk ‘shrinky dink’ to class.

6/27 Acids & Bases
Tuesday
Students will explore acids and bases by a variety of activities and demonstrations; modeling of Concept Attainment. Topics to be addressed include neutralization, titration, and pH.

Assignment for Wednesday 6/30: study for exam.

6/28 Exam
Weds
Work on projects and presentations

6/30 Presentations
Friday
Textbook and/or Other Materials or Equipment Required

Basis of Student Evaluation (grades)
Participation in class activities 25%
Homework 25%
Student presentation and Concept Activity plan 25%
Exam 25%

Letter Grade Requirements
90-100% A
80-90% B
65-80% C
Below 65% F