

# Falmouth High School

Curriculum Guide

Science Department



**Course Number 4212**  
**Chemistry CP**  
**Developed by Miguel Zamora**  
**2007-2008**

## Course Rationale

The purpose of this course is to prepare students for the further study of science, to develop critical thinking and problem-solving skills, and to provide students with sufficient background to understand new scientific and technological developments, resulting in a better understanding of the world.

## Course Description

**4212 Chemistry CP (Year)**

**Grades 10, 11, 12 (Lab Science) 4 Credits**

**Prerequisite: Algebra II completed or taking concurrently**

This course is designed to acquaint the student with basic chemical theory and laboratory skills. Topics include atomic theory, bonding, equilibrium, acids, bases, kinetic theory, and related chemical problems. These areas will prepare students to meet the requirements of the Massachusetts Curriculum Frameworks. The mathematics of chemistry is stressed. The schedule provides added time to complete laboratory activities.

### **Student Audience**

This course is designed as a college preparatory (CP) level course for students in grades 10-12.

### **Chemistry CP Core Text and Instructional Resources**

*Chemistry*, Prentice-Hall, 2007; standard laboratory equipment (glassware, basic chemicals, etc), assortment of demonstration equipment, Vernier lab-pros with graphing calculator technology, web sites related to chemistry.

## Content Specific Essential Questions

### **Essential Questions**

- How can physical and chemical properties be used to classify and describe matter?  
Each substance has a unique set of physical and chemical properties determined by each component.
- How are models of atomic structure used to help us understand the interaction of elements and compounds observed on a macroscopic scale?  
Because atoms are extremely small and their structure cannot be observed directly, scientists have proposed simplified pictures that explain how atoms are structured. With these pictures, scientists can predict the changes that matter can undergo.
- How are the elements arranged on the periodic table, and how does the arrangement reflect the electron configurations of the elements?  
When elements are arranged by increasing atomic number, it is possible to observe the periodicity of a number of properties. For example, elements within the same family share similar electron configurations, which translate into similar chemical properties.
- What happens when atoms bond with each other?  
In order for elements to become more stable by taking on the electron configuration of noble gases, they must gain or lose electrons. The result is the formation of ionic and covalent compounds.

- What happens to the atoms during a chemical reaction?  
Atoms cannot be created or destroyed during a chemical reaction, only rearranged (law of conservation of matter).
- How are balanced chemical equations used?  
If the ratio of products to reactants is known, it is possible to calculate the amounts of products formed and reactants used.
- How is the behavior of gases, liquids, and solids modeled by the kinetic molecular theory?  
The interactions between molecules determine the state of matter. Those interactions depend on the kinetic energy of the molecules and the strength of intermolecular forces.
- What is the role of energy in driving chemical reactions?  
Every chemical reaction involves the formation and breaking of chemical bonds. The breaking of chemical bonds requires energy while the making of chemical bonds releases energy.
- What determines the rate of a reaction?  
The rate of reaction depends on the frequency and efficiency of collisions between molecules. Factors such as temperature, concentration, and the presence of catalysts, which increase this frequency also increase the rate of reaction.
- What happens during acid-base and oxidation-reduction reactions?  
Acid-base reactions involve transfer of hydrogen ions from the acid to the base. In contrast, in a redox reaction there is a transfer of electrons from the reductant to the oxidant.

### Student Learning Outcomes

#### **Weighting of Grades**

Teachers in the science department will weight tests and quizzes as 60% of the quarterly grade. In general 2 or 3 quizzes will be considered the equivalent of one test. Labs, including formal lab reports, major projects, and homework will be weighted 40% of the quarterly grade. Alternatively, teachers may weigh labs, projects, and homework for 30% of the quarterly grade and include a 10% participation grade. The participation grade will consist of objective measurements such as notebook check, class work, and ungraded homework assignments checked for completion. Tardiness and absences will not be included in the participation grade. Midterm and final exams will be weighted 10% each 20% if only a final exam is given.

#### **Averaging of Grades**

Teachers in the science department will use the mean of test/quiz scores and the mean of scores on other student work during the quarter. These means will be weighted 60/40 or 60/30/10 in determining the quarterly grade. Major projects and lab reports will be counted more heavily than routine homework assignments.

#### **Retaking Tests and Quizzes**

Students may not retake tests except at the discretion of the teacher as specified in the classroom management plan. Only students in good academic standing, that is those who are consistently turning in class assignments, will be allowed to retake a test. The grade on the retake test will replace the first grade.

#### **Late Work**

Students are expected to turn in all assignments on the assigned date. Any late assignments may be accepted for reduced credit as outlined in the individual teacher's classroom management plan for up to 2 class days following the due date. No work will be accepted after the assessment on that particular unit. Students may make up tests until the end of the quarter. However, if a student does not make up the test by the end of the quarter, he or she will receive a grade of zero on that test. Students should recognize that the longer they wait to make up a test, the lower their score is likely to be.

#### **Use of Zeros**

Any assignment for which no work is turned in will receive a grade of zero. Long term or multiple step projects will receive partial credit based on the amount and quality of the work turned in.

