Rhode Island College and East Providence High School
The Early Enrollment Program
Syllabus: EEP Chemistry
Instructor: Mrs. Alana J. Nelson
School Year: 2013-2014

Course Description:
This is a full year course; topics include a review of classification of matter, history of the atom and atomic structure (atomic model I). Also included will be scientific measurement, atomic model II, electron arrangement, periodicity, formulas and nomenclature, chemical bonding, chemical equations, molecular geometry, stoichiometry, kinetic molecular theory, Gas Laws, Thermochemistry and Gibbs Free Energy related to exothermic and endothermic processes, Solutions, and Acids and Bases.

Required Text: Chemistry 10th edition by Raymond Chang

Course Requirements:

1. A problem solving approach will be utilized to investigate fundamental concepts in chemistry with an emphasis placed on mathematical application and laboratory work. Student will experience hands-on qualitative and quantitative laboratory activities to support their understanding of key concepts as well as develop laboratory techniques. There is mandatory afternoon lab component for this course where students will engage in lab activities [some micro-chemical] as well as group projects. Working together in groups [study buddies] is recommended, but work submitted must be independently done.

Additionally, there is a mandatory summer review assignment to be done independently and submitted the first full week of school. A Summative Assessment covering the summer assignment third week of school. This course can also include optional activities deemed necessary by the instructor.

Major concepts and principles will be introduced through a combination of lectures, labs, class and small group discussions and common assignments. Through an interactive learning environment an emphasis will be placed on development of critical thinking, communication, individual and team oriented skills.

Due to the pure nature of this course and the amount of material that must be covered, students must be responsible, self-motivated, and disciplined to meet academic expectations. Students will be responsible for individual and group performance in a variety of learning experiences.

2. Absences and Tardies:
   - **Tardies:** You must be in the classroom by the time the bell rings and on time. There is no such thing as “a little bit late”, you are either on time or you are late!
   - **Excused Absence:** When the student returns to school attendance form is required and must be signed by the parent, guardian, or physician. You must make up the work within a week. If you missed the day before a Summative Assessment (test), you will take the exam on the day assigned. If you miss a test, you will make up the said test up on the day you return.
   - **Unexcused Absence:** You must clear all your absences through attendance office.
   - **Absence during Semester Exam:** You must follow school policy and have a doctor’s note.
   - **If absent during the AFTER SCHOOL laboratory period due to an illness,** the student “MUST” contact the instructor on the day the student returns to school to schedule a make-up, and present a copy of a doctor’s note. The makeup lab activity “MUST” occur on the following Monday after school in room 270. Sports, band or chorus, any extra-curricular activity, or a doctor’s appointment does not constitute rescheduling a mandatory lab activity. Since the lab activities are on a Monday afternoons, you must plan around them. The lab activities run from...
1 to 2 hours depending on their complexity. Each student is “REQUIRED” to participate in the laboratory activity for submission of laboratory assignments.

- It is the responsibility of the student to be aware of any assignments given during the absence and arrange to make up all work missed.
- In the event of extended absences, the student will discuss the makeup schedule with the teacher “on THE DAY the student returns to school”.
- Long term assignments such as research papers, presentations, etc. will receive no time extensions.
- NOTE: The cumulative nature of this course requires regular attendance for academic success. Students with unexcused absences will not be permitted to make-up tests, lab work, homework, or quizzes.

**Grading:** Grades will be determined on a weighted category basis;

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summative Assessments (Tests), Semester Exams, &amp; Projects</td>
<td>35%</td>
</tr>
<tr>
<td>Daily Assessments (Quizzes)</td>
<td>20%</td>
</tr>
<tr>
<td>Lab Reports &amp; Activity Reports</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
</tbody>
</table>

- **Daily Assessments (Quizzes):** Will be based on reading assignments, class discussions, and/or other activities, may be either announced or unannounced.
- **Summative Assessments (Tests):** Will be based on reading assignments, class discussions, lab work, written homework and other classroom activities. Test dates will be announced and posted on the blackboard one week in advance. Students are expected to begin preparation at that time.
- **Semester exams (Midterm & Final):** Administered at the end of the second and fourth quarters, semester exams will focus on cumulative material from the previous quarters. Material covered on test will be announced.
- **Mandatory reading:** Reading scientific articles and/or literature [outside of text] will be evaluated and incorporated into the quarter grade when they are assigned.
- **Lab Reports:** Laboratory activities will consist of independent or group projects where it applies.
- **Technology:** The use of computer activities will be assigned to support concepts where applies and independently done and submitted as an activity report.

**COURSE OUTLINE:**

UNIT 1: Matter, Energy, and Measures [review]

Matter, Classification, and Properties
Separation Techniques for Mixtures
Measurements, Significant Figures and Dimensional Analysis
**ACTIVITY:** RI-IrTEST Phase Change
LAB: Identification of 4 Unknown substances Using Density
LAB: Heating and Cooling Curve: Melting-Freezing Point Determination of a Substance
LAB: Sublimation—Separation & Identification of an Unknown

UNIT 2: Atoms, Atomic Theory, and Electron Arrangement

Atomic Model I [atomic theory, parts of atom, and related concepts] (review)
Atomic Masses, the Mole Concept
Atomic Model II [Quantum Theory, Atomic Spectrum of Hydrogen, Bohr Model, de Broglie’s Equation, and the Quantum Mechanical Model]
Quantum Numbers and Electron Arrangement
Electromagnetic Radiation, Spectra [emission & absorption], and calculations
ACTIVITY: RI-TEST Atoms, Excited States and Photons
ACTIVITY: RI-TEST Spectroscopy
LAB: Flame Test [if gas safety valve replaced]

UNIT 3: Periodic Table and Periodicity

Historical Development of Periodic Table (review)
Organization, Electron Arrangement, Elements & Properties (review)
Periodicity & Periodic Table (review)
LAB: Group 2A Activity/Reactivity

UNIT 4: Chemical Formulas & Nomenclature

Formula Types [covalent and ionic] (review)
Application of Oxidation Numbers & Writing Formulas
Percent Composition
Nomenclature [name that compound]
LAB: Composition of a Hydrate
LAB: Determination of Empirical Formula

UNIT 5: Chemical Bonding, Molecules, Molecular Structure, & Dipole or Not

Nature of Ionic, Covalent & Metallic Bonds (review)
Application of Electronegativity
Bond Character & Determination of Bond Type
Bonds in Space [electron distribution, VSEPR, hybridization]
Molecular Geometry [common molecules, carbon, bond multiplicity]
Sigma & Pi Bonds
Polarity of Molecules & Electron Distribution [dipole moment]
Intermolecular Forces of Attraction [IMF’s]
ACTIVITY: RI-TEST Van derWaals Attractions
ACTIVITY: RI-TEST VSEPR-The Shapes of Molecules
ACTIVITY: RI-TEST Chemical Bonds
ACTIVITY: Molecular Models, Analysis & Dipole Moment Determination

UNIT 6: Mole Connection, Reactions & Stoichiometry

Balancing Equations
Reaction Types & Prediction
Mole Connection, Stoichiometry & Reactions
Limiting Reagents & Theoretical Yield
[If time--Reaction Mechanisms]
LAB: Types of Chemical Reactions
LAB: Synthesis of Manganese (II) Chloride
(if time allows--LAB: Analysis of Copper Oxide [Cu\textsuperscript{+1} or Cu\textsuperscript{+2} determination])

UNIT 7: Energy, Changes in State, & Chemical Change

Nature of Energy & Measuring Heat
Chemical Energy [enthalpy & changes]
Thermochemical Equations
Heat Curves
Changes in State [includes heats of fusion & vaporization, & enthalpy changes]
Spontaneity, Entropy, & Free Energy
LAB: Specific Heat Determination & Identification of an Unknown

UNIT 8: Kinetic Molecular Theory, and Gas Laws

Kinetic Theory of Gases
Gas Laws: Boyles, Charles, Gay-Lussac’s Laws, Combined Gas Law, Daltons
Law of Partial Pressure, Grahams Law of Diffusion/Effusion
Avogadro’s Principle
Ideal Gas Law
Gas Stoichiometry
ACTIVITY: RI-ITEST Gas Laws
LAB: Graham’s Law of Diffusion
LAB: Determination of Molar Volume of a Gas & the Universal Gas Constant

UNIT 9: Solutions and Colloids

Solutions & Dissolving Process
Solution Equilibrium
Precipitation Reactions
Dissolving Effects & Concentration
Moles & Solutions [Molarity, Molality, Percent by Mass]
Colloids, Phases, Sizes, & Properties
Colligative Properties [VP Changes, Boiling & Freezing Points]
Boiling Point Elevation & Freezing Point Depression
Solubility Product Constant

UNIT 10: Acid, Bases, and Salts [IF TIME ALLOWS]

Arrhenius, Brönsted-Lowrey, and Lewis Theory
Naming of Binary Acids, Ternary Acids & Bases & Organic Acids & Bases
Acid-Base Behavior
Acidic and Basic Anhydrides
Strengths of Acids and Bases
Auto-ionization of Water
pH scale, Hydrolysis & Buffers
Titration [indicators & titration]
LAB: Properties of Acids & Bases
LAB: Titration of an Acid & a Base