Chemistry B Course Syllabus

VAPA at South Region High School #9

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Overview

Chemistry B provides you with a project based introduction to the study of matter and chemicals. You explore chemical reaction, acids and bases, solutions, gas laws, nuclear and organic chemistry by dealing with real world situations. Many times, projects have the potential to impact your community and the world. Laboratory skills, questioning and inquiry, scientific principles, and 21st Century technology are emphasized.

Mr. Adolfo's website provides a wealth of information including daily assignments, PowerPoints, Worksheets, links to instructional videos, and rubrics and is a recommend resource, especially when students have prolonged absences.

Assignments

Assignments are listed. Students will also express their understanding by creating projects such as multimedia projects, research papers, art work, demonstrations, presentations, and more. Students will be provided with rubrics and due dates for all deliverables.

Individual Assignments	Points
Projects	100
Weekly Homework	10
Weekly Homework Challenge	15 (with 5 points Extra Credit)
Weekly Vocabulary Assignement	10
Note Taking	5
Other Classwork Assignments	5
Laboratories:	25
Presentations	30
Quizzes	50
Final Exam	200

The "Homework Challenge" allows you to demonstrate knowledge of the content (instead of doing the homework questions) by answering a question of Mr. Adolfo's choosing in front of the class. The rubric for essay type questions is provided on the website. If the question involves calculations, the result may contain only 1 or 2 computational or significant figure errors. This will be conducted weekly, usually on Thursdays, and you must be present to select this option.

Absences and Tardiness

Since legitimate absences do occur, it is expected that you will turn in any assignments that were due during the absence by the day after you return. Exceptions may be made in the case of the prolonged excused absence due to a documented medical condition. Both the website and email are available to stay up to date.

Tardiness disrupts the whole class and will count directly against your class participation grade. If you are late, slip in quietly. Excessive absences and tardiness may lead to academic failure.

How Grades are Computed

Final Letter Grades will be based on a percentage of total points available at the end of the Semester.

A:	90% and above	D:	60% and above
B:	80% and above	F:	below 60%
C:	70% and above		

Required Materials

Spiral Bound Notebook
Scientific Calculator (recommended)

All assignments (except projects, quizzes, and exams) will be completed in a bound spiral notebook All assignments should be completed in chronological order and must be labeled with the assignment date and title. Notebooks will be collected graded approximately once every two weeks.

Topics Covered (numbers and letters correspond to California Chemistry Standards)**:**

3. **The conservation of atoms in chemical reactions** leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants. As a basis for understanding this concept:
   a. Students know how to describe chemical reactions by writing balanced equations.
   b. Students know the quantity one mole is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams.
   c. Students know one mole equals 6.02×10^{23} particles (atoms or molecules).
   d. Students know how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure.
   e. Students know how to calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses.

4. **The kinetic molecular theory** describes the motion of atoms and molecules and explains the properties of gases.
   a. The random motion of molecules and their collisions with a surface create the observable pressure on that surface.
   b. Random motion of molecules explains the diffusion of gases.
   c. Apply the gas laws to relations between the pressure, temperature, and volume of any amount of an ideal gas or any mixture of ideal gases.
   d. The values and meanings of standard temperature and pressure (STP).
   e. Convert between the Celsius and Kelvin temperature scales.
   f. There is no temperature lower than 0^{o} Kelvin (Absolute Zero).
   g.* The kinetic theory of gases relates the absolute temperature of a gas to the average kinetic energy of its molecules or atoms.
   h.* Students know how to solve problems by using the ideal gas law in the form PV = nRT.
   i.* Students know how to apply Dalton's law of partial pressures to describe the composition of gases and Graham's law to predict diffusion of gases.

5. **Acids, bases, and salts** are three classes of compounds that form ions in water solutions. As a basis for understanding this concept:
   a. Students know the observable properties of acids, bases, and salt solutions.
   b. Students know acids are hydrogen-ion-donating and bases are hydrogen-ion accepting substances.
   c. Students know strong acids and bases fully dissociate and weak acids and bases partially dissociate.
   d. Students know how to use the pH scale to characterize acid and base solutions.
   f.* Students know how to calculate pH from the hydrogen-ion concentration.

6. **Solutions are homogenous** mixtures of two or more substances. As a basis for understanding this concept:
   a. Students know the definitions of solute and solvent.
   b. Students know how to describe the dissolving process at the molecular level by using the concept of random molecular motion.
   c. Students know temperature, pressure, and surface area affect the dissolving process.
   d. Students know how to calculate the concentration of a solute in terms of grams per liter, molarity, parts per million, and percent composition.
   e.* Students know the relationship between the molality of a solute in a solution and the solution's depressed freezing point or elevated boiling point.

9. **Chemical equilibrium** is a dynamic process at the molecular level. As a basis for. As a basis for understanding this concept:
   a. Students know how to use LeChatelier's principle to predict the effect of changes in concentration, temperature, and pressure.
   b. Students know equilibrium is established when forward and reverse reaction rates are equal.
   c.* Students know how to write and calculate an equilibrium constant expression for a reaction

7. **Energy** is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:
   a. Students know how to describe temperature and heat flow in terms of the motion of molecules (or atoms).
   b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.
   c. Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.
   d. Students know how to solve problems involving heat flow and temperature changes, using known values of specific heat and latent heat of phase change.

10. **The bonding characteristics of carbon** allow the formation of many different organic molecules of varied sizes, shapes, and chemical properties and provide the biochemical basis of life. As a basis for understanding this concept:
   a. Students know large molecules (polymers), such as proteins, nucleic acids, and starch, are formed by repetitive combinations of simple subunits
   b. Students know the bonding characteristics of carbon that result in the formation of a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.
   c. Students know amino acids are the building blocks of proteins.
   d.* Students know the definition and role of activation energy in a chemical reaction.

11. **Nuclear processes** are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion. As a basis for understanding this concept:
   a. Students know protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.
   b. Students know the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by $E = mc^2$) is small but significant in nuclear reactions.
   c. Students know some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions.
   e. Students know alpha, beta, and gamma radiation produce different amounts and kinds of damage in matter and have different penetrations.

*Will be covered if time permits.