Chemistry I Syllabus

Teacher: Mr. Lester **Room:** S503 in MTSU Hall
email: jeff.lester@tcsedu.net
Textbook: *Glencoe Chemistry: Matter and Change*
Course Description: This course is an introduction to the study of matter and energy, and it is designed to prepare the successful student for success in AP or college level chemistry classes. Course content includes development of an understanding of chemistry, cultivation of problem-solving and critical-thinking skills related to chemistry, application of chemistry knowledge to decision-making about scientific and technological issues, recognition of the importance of chemistry in daily life, and understanding of benefits as well as limitations of science and technology.

Supplies:

Pencils
Preferred writing utensil for notes-PENCIL
SPIRAL NOTEBOOK

Lab Fee: There is a $20.00 lab fee for this course (assessed for all science classes). The lab fee is essential for conducting quality science classes and does not cover the above list of materials. The more fee money we collect, the more quality activities we can conduct. This class will involve a great deal of lab.

Class Schedule: An updated schedule is available on the class webpage (Google classroom information provided). Please refer to this updated schedule daily to be certain you are aware of due dates and class activities.

Classroom Expectations:
My responsibilities as your teacher are:
1. To treat you with respect and care as an individual.
2. To teach you the required content.

3. To provide you an orderly classroom environment, providing the necessary discipline and motivation, so that you can learn.
4. To constantly work to improve my knowledge and skills so that I can be a better teacher to you.
5. To listen to your suggestions and strive to make this class better each day.

You can succeed in this class, and I will help you do so!

Your responsibilities as my student are:

1. To abide by school and class rules at all times.
2. Complete required assignments in a timely manner.

Discipline: If you choose to disrupt class, the following sequence of interventions will occur:

1. A verbal warning.
2. Teacher detention (on my schedule), Behavior Management Plan, parent contact.
3. If detention is not completed or if there is still a discipline problem, administrative detention will be assigned; parents will be called.
4. Sent to office.

Severe disruptions: Student will be sent immediately to office.

Grading: I use the points system. Different assingments will have different point values, as indicated in Schoology.

There will be no Midterm Exam included in the 3rd Quarter grade; the EOC test will be 25% of your 4th Quarter grade.

Schoolology: You are expected to use your online accounts to check grades regularly and to gain access to course handouts, announcements, and website links. If you (or your parent) have not set up your online account or do not remember how to use it, please see Mrs. Pendergraff for help. THS has computers available in the library before school, as well. A general schedule of topics is provided in this syllabus.

Late Work: Late work may be accepted (at the discretion of the teacher) through the end of the week during which it was due. Chronic late work will not be accepted. Points will be deducted for all late work. I notify you of due dates in plenty of time. You cannot get behind and expect to perform well on the EOC.

Make-up Work: Because this class involves many hands-on activities and exercises, attendance is very important; days missed are difficult to make up. Students should attend school every day possible to ensure their success. It is always the student's responsibility to find out what was missed and to ensure that it is turned in.

Excused/Unexcused Absence: **Get daily assignments by checking with the teacher. This is your responsibility!** These are due within three days. Any quizzes, labwork, or tests missed will need to be rescheduled for a later date **on the day you return** to school. A written report will be assigned to make up for a missed hands-on activity.

Notebook: You are required to keep a notebook with all of your work for this class. **All materials for this class are to be placed in your notebook.** It is your decision how you choose to organize the notebook, but you need to be able to access materials upon request.

** Important Note: You ***WILL*** have homework in this class. It is not possible to learn chemistry without actively involving yourself in studying the material. Do not expect to pass if you do not complete homework in a timely manner. **

General Chemistry Standards

CHEM1.PS1: Matter and Its Interactions

1) Understand and be prepared to use values specific to chemical processes: the mole, molar mass, molarity, and percent composition.
2) Demonstrate that atoms, and therefore mass, are conserved during a chemical reaction by balancing chemical equations.
3) Perform stoichiometric calculations involving the following relationships: mole-mole; mass-mass; mole-mass; mole-particle; and mass-particle. Show a qualitative understanding of the phenomenon of percent yield, limiting, and excess reagents in a chemical reaction through pictorial and conceptual examples. (states of matter liquid and solid; excluding volume of gasses) 4) Use the reactants in a chemical reaction to predict the products and identify reaction classes (synthesis, decomposition, combustion, single replacement, double replacement).
5) Conduct investigations to explore and characterize the behavior of gases (pressure, volume, temperature), develop models to represent this behavior, and construct arguments to explain this behavior. Evaluate the relationship (qualitatively and quantitatively) at STP between pressure and volume (Boyle's law), temperature and volume (Charles's law), temperature and pressure (Gay-Lussac law), and moles and volume (Avogadro's law), and evaluate and explain these relationships with respect to kinetic-molecular theory. Be able to understand, establish, and predict the relationships between volume, temperature, and pressure using combined gas law both qualitatively and quantitatively.
6) Use the ideal gas law, PV = nRT, to algebraically evaluate the relationship among the number of moles, volume, pressure, and temperature for ideal gases.
7) Analyze solutions to identify solutes and solvents, quantitatively analyze concentrations (molarity, percent composition, and ppm), and perform separation methods such as evaporation, distillation, and/or chromatography and show conceptual understanding of distillation. Construct an argument to justify the use of certain separation methods under different conditions.
8) Identify acids and bases as a special class of compounds with a specific set of properties.
9) Draw models (qualitative models such as pictures or diagrams) to demonstrate understanding of radioactive stability and decay. Understand and differentiate between fission and fusion reactions. Use models (graphs or tables) to explain the concept of half-life and its use in determining the age of materials (such as radiometric dating).
10) Compare alpha, beta, and gamma radiation in terms of mass, charge, and penetrating power. Identify examples of applications of

different radiation types in everyday life (such as its applications in cancer treatment).
11) Develop and compare historical models of the atom (from Democritus to quantum model) and construct arguments to show how scientific knowledge evolves over time, based on experimental evidence, critique, and alternative interpretations.
12) Explain the origin and organization of the Periodic Table. Predict chemical and physical properties of main group elements (reactivity, number of subatomic particles, ion charge, ionization energy, atomic radius, and electronegativity) based on location on the periodic table. Construct an argument to describe how the quantum mechanical model of the atom (e.g., patterns of valence and inner electrons) defines periodic properties. Use the periodic table to draw Lewis dot structures and show understanding of orbital notations through drawing and interpreting graphical representations (i.e., arrows representing electrons in an orbital).
13) Use the periodic table and electronegativity differences of elements to predict the types of bonds that are formed between atoms during chemical reactions and write the names of chemical compounds, including polyatomic ions using the IUPAC criteria.
14) Use Lewis dot structures and electronegativity differences to predict the polarities of simple molecules (linear, bent, trigonal planar, trigonal pyramidal, tetrahedral). Construct an argument to explain how electronegativity affects the polarity of basic chemical molecules.
15) Investigate, describe, and mathematically determine the effect of solute concentration on vapor pressure using the solute's van 't Hoff factor on freezing point depression and boiling point elevation.

CHEM1.PS2: Motion and Stability: Forces and Interactions

1) Draw, identify, and contrast graphical representations of chemical bonds (ionic, covalent, and metallic) based on chemical formulas. Construct and communicate explanations to show that atoms combine by transferring or sharing electrons.
2) Understand that intermolecular forces created by the unequal distribution of charge result in varying degrees of attraction between molecules. Compare and contrast the intermolecular forces (hydrogen bonding, dipole-dipole bonding, and London dispersion forces) within different types of simple substances (only those following the octet rule) and predict and explain their effect on chemical and physical properties of those substances using models or graphical representations. 3) Construct a model to explain the process by which solutes dissolve in solvents, and develop an argument to describe how intermolecular forces affect the solubility of different chemical compounds.
4) Conduct an investigation to determine how temperature, surface area, and stirring affect the rate of solubility. Construct an argument to explain the relationships observed in experimental data using collision theory.

CHEM1.PS3: Energy

1) Contrast the concepts of temperature and heat in macroscopic and microscopic terms. Understand that thermal energy is a form of energy and temperature is a measure of average kinetic energy of a group of particles.
2) Draw and interpret heating and cooling curves and phase diagrams. Analyze the energy changes involved in calorimetry by using the law of conservation of energy quantitatively (use of $q = mc\Delta T$) and qualitatively.
3) Distinguish between endothermic and exothermic reactions by constructing potential energy diagrams and explain the differences between the two using chemical terms (e.g. activation energy). Recognize when energy is absorbed or given off depending on the

bonds formed and bonds broken.

4) Analyze energy changes to explain and defend the law of conservation of energy. **CHEM1.PS4: Waves and Their Applications in Technologies for Information Transfer**

1) Using a model, explain why elements emit and absorb characteristic frequencies of light and how this information is used.

Chemistry I Tentative Schedule

First 9-weeks of the semester

1. Scientific Method and the Math of Science (Scientific and Engineering Practices)
2. Matter and Thermochemistry (Chem1.PS3.1-Chem1.PS3.2, Chem1.PS1.15)
3. Liquids and Solutions (Chem1.PS1.7-Chem1.PS1.8; Chem1.PS2.4)
4. Gases (Chem1.PS1.5-1.6)
5. Atoms (Chem1.PS1.11; Chem1.PS4.1)
6. Nuclear Chemistry (Chem1.PS1.9-1.10)
7. Periodic Table and Trends (Chem1.PS1.12)

Second 9-weeks of the semester

1. Bonding and Naming Compounds (Chem1.PS1.12-1.13)
2. Lewis structure and VSPER (Chem1.PS2.2-2.3, Chem1.PS1.14)
3. Chemical Reactions (Chem1.PS1.2)
4. Types of Reactions (Chem1.PS1.4)
5. Moles and Stoichiometry (Chem1.PS1.1, Chem1.PS1.3)