Chemistry Syllabus
Metro Classical and Academic High School
2020-2021

Instructor: Mr. Frederick Pontillas **Course Website:** https://www.slps.org/Page/33378

Email: ulpianofrederick.pontillas@slps.org (preferred contact) **Phone:** (314) 534-3894

Required Materials: 1) Holt Chemistry Textbook 2) Notebook (Spiral or 3 ring binder with paper) 3) Folder 4) Writing utensil 5) Calculator (Scientific are sufficient. Graphing are allowed.)

Course Outline

Quarter 1	Quarter 2	Quarter 3	Quarter 4
Particle View of Matter	Chemistry of Climate Change	Atoms, Elements, & Compounds	Chemical Reactions
Plan and conduct an investigation to gather evidence to compare the structure and properties (m.p., b.p., density, etc.) of substances at the bulk scale to infer the strength of electrical forces between particles • Mass, Volume • Density (dimensional analysis) • Other properties of matter • Classification of matter based on particles - substance, element, compound, etc. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	Plan and conduct an investigation to gather evidence to compare the structure and properties (m.p., b.p., density, etc.) of substances at the bulk scale to infer the strength of electrical forces between particles. • Gas Laws • Particle models of behaviors of gases Use a model to describe how variations in the flow of energy into and out of Earth's System result in changes in climate. • Greenhouse effect with a focus on vibrations of greenhouse gas molecules Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. • Visual data analysis skill building using climate-related representations Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). • Particle models for gas behavior	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. • Atomic structure • Periodic trends • Ions • Bonding types (ionic, covalent, metallic) Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. • Radioactive isotopes • Types of nuclear decay • Fission & fusion reactions Apply the concepts of bonding and crystalline/molecular structure to explain the macroscopic properties of various categories of structural materials. • Bonding models explain properties (conductivity, solubility, etc.) Plan and conduct an investigation to gather evidence to compare the structure and properties (m.p., b.p., density, etc.) of substances at the bulk scale to	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. • Reactions – rearrangements of atoms • Types of reactions • Predictions of products Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. • Collisions of particles affected by temp/ concentration (particle models) Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. • Moles/ Mole Ratios • Limiting Reagents / Percent Yield Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. • Le Chatelier's principle • Refine designs of chemical reaction systems Evaluate a solution to a complex real world problem based on prioritized criteria and trade-offs that account for a range of

	• Chemical, phase, thermal energy (bar charts) Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. • Radioactive carbon dating of ice cores Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. • Chemical/physical changes • Combustion reactions (only) as a type of exothermic reaction Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. • Exothermic and endothermic reactions • Vibrational modes of greenhouse gas molecules Predict how human activity affects the relationships between Earth systems in both positive and negative ways. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions for account for societal needs and wants.	infer the strength of electrical forces between particles • Polarity • Intermolecular forces Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts

Course Objectives

At the completion of this course, the student will be able to:

1. Explain and describe the states of matter and how they behave.
2. Explain the structure of the atom and how it is organized
3. Understand the types of bonds that atoms use to make compounds and why
4. Be able to name and form compounds and how they react in chemical reactions.
5. Understand the law of conservation of matter and demonstrate how use it mathematically
6. Explain equilibrium and predict how equilibrium is established.
7. Be able to calculate pH.
8. Ask questions (science) and define problems (engineering).
9. Use and develop a model.
10. Analyze and interpret data.
11. Plan and carry out an investigation.
12. Use mathematical and computational thinking.
13. Construct explanations (science) and design solutions (engineering).
14. Engage in an argument from evidence.
15. Obtain, evaluate, and communicate information.

Grading: Grades will be determined by the following formula:

$$Percent\ grade = \frac{Earned\ points + Extra\ Credit}{Possible\ points - Exemptions} \times 100$$

There are many different factors that contribute to your chemistry grade so that there are no large High Stakes assignments, including the final.

Chemistry Class Components	Typical percent contribution for semester grades
Unit Tests (75 - 100 pts ea) + Comprehensive Final Exam (150 pts)	35%
Lab Reports (20-25 pts ea)	10%
Classwork (10-15 pts ea)	10%
Homework (2 pts ea)	5%
Formative Assessments (1-2 pts ea) (exempted for absences)	15%
Participation (1 pt ea)	5%
Comprehensive Final Exam (150 pts)	15%

Letter Grades ***"Success is the maximum utilization of the ability that you have."—Zig Ziglar***

A (89.5 to 100) **B (79.5 to 89.4)** **C (69.5 to 79.4)** **F (<69.4)**

Because there will be extra credit opportunities throughout the semester, final grade percentages will not be modified. Extra Credit contributions to your chemistry grade **shall not exceed 5%.** Any extra credit opportunity that may arise will be available to all students. Extra Credit will be applied to your class average only at the end of each semester.

Tests: Unit Tests will occur upon completion of the corresponding unit are typically 80 pt tests. You will receive a study guide for each test outlining the *vocabulary* you need to use, the *concepts* you will need to know, and the *skills* you need to be able to perform. It will also explain the *number and types* of questions including a variety of multiple choice, matching, fill in the blank, short answer and calculations. It will usually take the form of a practice test that mirrors what the actual test will look like so there should be no surprises. If you miss a test day, you will need to take an alternate

version of the test as soon as you can. If you earn **<60 % on a test**, you are **required to retest**. Your two scores will be averaged for your unit test grade. You may retest only once per test. Retests must be completed after school, before school or during lunch.

Lab Reports: One laboratory report per semester will use the "Formal Chemistry Laboratory Format" document that will be provided separately. All other lab reports will be informal. Lab Reports are graded on a 20-25 point scale and are due one week after the experiment has been done unless otherwise noted. Points may be deducted for late reports at a rate of 5 points each class it is late.

Classwork: There three types of classwork. Announced **quizzes**, special **learning activities** including cooperative learning or games, and hands-on **mini lab activities** that do not require a formal report.

Homework: There will be homework nearly every class. Often you will be able to begin the homework assignment during class time when I am available to help as needed. Homework assignments are due at the beginning of our next class. Homework is graded on effort and completion. 2 pts are awarded if the assignment is complete and on time, even if there are mistakes. 1 pt is awarded if a good start was made, but the work is not complete or late. And a 0 is recorded if the assignment is simply not done. Students should correct their work as needed during the homework review and ask questions if anything remains unclear.

Fair warning: Not doing the homework assignments with your best effort is the quickest way to sabotage your chemistry grade.

Participation and Formative Assessment:

A. P3 Challenge: Most classes will begin with a 3 to 5 minute P3 challenge which may be a review question, a sampling from the homework, or a question relating to the lesson for the day. P3 stands for **P**resent, **P**repared and **P**roficient. You earn one point for being present and prepared with a writing utensil, and you earn a second point if you answer the question correctly.
B. Exit Slips: Most classes will end with an exit slip which may be a problem like a P3 challenge, a demonstration of progress on the homework for the day, or a verbal question. Exit slips will be worth one point.
C. Participation: Each day there will be one point awarded for attention, effort and participation.

Final: The final for the course will be comprehensive for each semester with no exemptions.

Absences and Tardies: When you have an excused absence, you are exempted from the P3 Challenge, Exit Slip, Participation and anything else beyond your control for that day. Regardless of the reason for the absence, you are *still responsible* for completing the homework (due upon return to class for full credit), classwork, laboratory experiments or tests in a timely fashion. You are also expected to obtain a copy of the notes from a classmate and to check the course website to download the classroom materials from the day. All makeup or late work needs to be completed by the end of the corresponding unit. The grade for any work still missing may become a zero score on the unit test day. If you are tardy, you are responsible for all missed work. There are no exemptions for tardiness. More than 4 tardies in a semester will result in a referral to administration.

Elective Peer Tutoring: (*The secret to success*) You may elect to sign in for tutoring time during lunch or after school. Anytime more than one student is working together, helping each other out with chemistry, 1 pt extra credit/30 min will be awarded to both students because most of the time, the distinction between a tutor and a tutee is very blurred. I will be available to help or reteach as needed. Forming study groups is a powerful way to study science. (Remember, Extra Credit earned may not exceed 5% of your final grade.) **Required Tutoring:** If your class average falls below 70%, it is required that you participate in tutoring to correct your mistakes and clarify misunderstandings until your grades improve.

Classroom Norms:

1) No Cell phone use unless authorized by teacher – (placed in door bag if used) – Collected during tests 2) No food in chemistry room. Only water to drink if allowed. (Safety issue)
3) Participate Fully, be on time, stay in class
4) Off topic conversations shelved for later

5) Respect everyone's learning process and progress, including your own – Everybody makes mistakes.
6) Do your best
7) Adhere to all rules and regulations outlined in the Student Handbook.

Typical Classroom Procedures:

1) Arrive on time
2) P3 challenge; homework check
3) Homework review
4) Lesson activities—Varies
5) Record/Obtain the Homework assignment **period**
6) Complete the Exit Slip.

Visit bathroom, or get water**, before or after class**.
Blow your nose discretely.
Wait to be dismissed. *Not always* upon completion of exit slip.
Stay seated unless otherwise directed.
Label all work with your name, date, "Chemistry", and

E.g. " Jared S. 9/13 Chem 2"