

SYLLABUS

QVS AP Chemistry 22/23
QSI Virtual School

Semester/Term: 2022/23

Meeting Days: QVS AP Chemistry Moodle (Monday –Sunday)

Time: On demand

Location: QVS AP Chemistry Moodle

Instructor Information

Instructor: Christi Kitchens

Email: Christi-Kitchens@qvs.qsi.org

Online Office Hours: By appointment

Physical Location: Round Rock Texas (Central Time Zone)

Skype: christi.kitchens

Zoom: <https://us04web.zoom.us/j/3371776671?pwd=SW81clJKOGkxa3NlNkFEWHBRSIhUT09>

Teams Classroom: Where class meetings are held (students will be enrolled upon course start)

Preferred Method of Communication: Email or Teams message for students (email for parents)

Course Description

The AP Chemistry course is equivalent to a first-year university course. This course gives general university level chemistry that is the foundation for further study at university. This course encompasses using chemistry content combined with utilizing the science practices through laboratory work which allows students to be engaged in making models and representations, asking questions, planning methods, representing data, explaining phenomena, analyzing phenomena, utilizing mathematical routines, and voicing argumentation. These science practices will spiral through the content of the course.

This course is structured around the four big ideas articulated in the AP Chemistry Course and Exam Description (CED) provided by College Board. Students should attain a depth of understanding of the fundamentals of chemistry and reasonable competence in dealing with chemical problems as seen below and directly taken from pages 16-17 in AP Chemistry Course and Exam Description.

- **BIG IDEA 1: SCALE, PROPORTION, AND QUANTITY (SPQ)** Quantities in chemistry are expressed at both the macroscopic and atomic scale. Explanations, predictions, and other forms of argumentation in chemistry require understanding the meaning of these quantities, and the relationship between quantities at the same scale and across scales.
- **BIG IDEA 2: STRUCTURE AND PROPERTIES (SAP)** Properties of substances observable at the macroscopic scale emerge from the structures of atoms and molecules and the interactions between them. Chemical reasoning moves in both directions across these scales. Properties are predicted from known aspects of the structures and interactions at the atomic scale. Observed properties are used to infer aspects of the structures and interactions.
- **BIG IDEA 3: TRANSFORMATIONS (TRA)** At its heart, chemistry is about the rearrangement of matter. Understanding the details of these transformations requires reasoning at many levels as one must quantify what is occurring both macroscopically and at the atomic level during the process. This reasoning can be as simple as monitoring amounts of products made or as complex as visualizing the intermolecular forces among the species in a mixture. The rate of a transformation is also of interest, as particles must move and collide to initiate reaction events.

• **BIG IDEA 4: ENERGY (ENE)** Energy has two important roles in characterizing and controlling chemical systems. The first is accounting for the distribution of energy among the components of a system and the ways that heat exchanges, chemical reactions, and phase transitions redistribute this energy. The second is in considering the enthalpic and entropic driving forces for a chemical process. These are closely related to the dynamic equilibrium present in many chemical systems and the ways in which changes in experimental conditions alter the positions of these equilibria.

The course will also allow students to develop their ability to think clearly and to express their ideas, both orally and written, with clarity and logic.

Course Prerequisites

Mastery of one year of Chemistry or equivalent preferred, mastery of one year of Algebra or equivalent and mastery of one year of secondary literature and writing or equivalent.

Required Materials

1- Scientific calculator

2 – AP Chemistry Books (For Student Reference and Additional Reading at this time)

Open Stax Chemistry 2e: <https://openstax.org/details/books/chemistry-2e?Book%20details>

Chemistry: An Atoms-Focused Approach (First AP Edition): You will need to gain access via your individual schools. This is an online rental from Vital Source, not a hard copy.

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EBOOK ISBN:978-0-393-41717-3

Lab Resources Required:

3 – Labster online resource: <https://www.labster.com/> (login information will be provided)

4 - PhET Lab simulator resources – students will sign up for an account on their own – is Free
<https://phet.colorado.edu/en/simulations/filter?sort=alpha&view=grid>

5 – Various other random lab simulations throughout the year as determined needed by content, access, and teacher.

Technology Information and Requirements

Computer with internet access and ability to run the required lab programs

Working Word and Excel Programs (Microsoft Office for students is perfect)

Working PDF reader (some files are in PDF format and must be readable by student computers)

Microphone

Scanning ability (Can be via free app on cell phone. I use Scannable (free), but there are others)

Graphing calculator, TI-83 or TI-84+ recommended

Course Grading

Grading Policies

QVS Virtual School is a member of Quality Schools International. At our organization we follow the Glasser model of mastery learning. This means that students need to show mastery of units before they are allowed to pass them. This means that the student must demonstrate that s/he understands the concept inside and out. I design my courses with this in mind. All assessments are geared towards allowing students to demonstrate that they have mastered the unit. Each class has ten (10) units in it, and all units must be passed at the A or B level for the student to move on.

Every unit has a start date and an end date per your course calendar. When a unit starts the QVS teacher enters a “P” for all students into QMS to indicate the unit is in progress. When the unit ends the QVS teacher enters an “A” or a “B” depending on the level of mastery. If the student did not master the unit, the teacher will enter a “D.” As stated in the QVS handbook:

- D – “deficient in effort” This grade communicates that the student is not meeting expectations about the amount of work submitted in a given time period.

If the student does not master the unit where a “D” was assigned when future units start, the teacher will continue to enter “P’s” for those new units indicating that this is the unit in which the course has since progressed. A “P” that appears after a “D” on the transcript does NOT mean that the student is working in that unit, it is simply present to show where in the course the student should be at the time.

- Example of QMS grades for a student who completed the first two units, but not the third unit while the course has moved to unit 4 per the course calendar:

- o E01: B, E02: B, E03:D, E04:P

- Example of a QMS grades for a student who completed the first two units but not the third and the fourth unit while the course has moved into unit five per course calendar:

- o E01: B, E02: B, E03:D, E04:P, E05:P

- Example of a student who is still working in unit three in February:

- o E01: B, E02: B, E03:D, E04:P, E05:P, E06:P, E07:P

The teacher will decide based on the course, how much time will pass before a “D” is entered into QMS, however, it is usually entered upon the beginning date of the following unit. This should be applied evenly for each student. However, an extended period of time (possibly no more than one week) should not pass before a “D” is entered into QMS for a student who is demonstrating this behavior. If a “D” grade is resolved yet the student is five units behind, then the next unit which was a “P” will now become a “D.” This pattern will continue until the student is back on pace with the course.

Per teacher's professional judgement and individual circumstances and course progress options, a teacher may stop a student from working in a unit and have him/her start the next unit without finishing the previous one. To indicate this the teacher will place an “H” into QMS. The teacher will communicate with the student that the unit is “on hold” and direct the student to the unit where they should be working.

If a student does not make sufficient effort to complete an assignment, parents will be contacted immediately. In addition, students may be required to complete extra assignments to provide them with the extra time and instruction to demonstrate that they understand the material.

To fully benefit and fulfill the purpose of an upgrade, I expect upgrades to be submitted in a timely fashion. The QVS policy states that upgrades must be completed by the end of the next unit or the Unit in question will remain at the B Mastery grade. At a time in which the student is caught up on the current unit, the student will be allowed to work on any previous units upon permission from the teacher.

Please do not assume that doing an upgrade assignment or revision means that you will automatically get the upgrade: you always have to show A-level work to receive an A.

A and B Level Mastery:

To receive a B for any unit, you must master all of the B level assignments and score at least AP 3 for the quizzes and final assessments. AP 3 is generally assigned at ~58% or higher. Unless otherwise indicated, all assignments are assumed to be B level assignments.

To receive an A for any unit, you must master all of the B level assignments, A level assignments (if assigned) and score at least an AP 4 or 5 for the quizzes and final assessment. AP 4 is generally assigned at ~68% or higher and AP 5 ~ 75% or higher.

Feedback

I strive to return feedback on all submissions within 24 hours, however, work submitted on Friday or over the weekend might take a little longer.

Unit Completion

Units will be completed in the order presented on the moodle. If a unit is not mastered, the student will remain in that unit until such a time that the unit has been mastered prior to moving forward to the next unit. The teacher will assist struggling students in any way possible to aid with understanding and mastery so that the student is able to move to the next unit, however, it is the students responsibility to reach out to the teacher for additional help immediately if the student has a question or is struggling with a concept.

June Unit Completion

Only 2 Units will be allowed to be completed during the month of June, therefore, it is important that 8 units are completed by the end of May in order to complete the course on time.

Course content

***Disclaimer: Online courses are a work in progress and are constantly changing. The course work outlined below is current, but I reserve the right to add, delete or change lessons, assignments, project, assessments or other activities as needed to best serve the students learning. The syllabus will be updated as needed and should be available (as updated) via the link provided on the moodle.**

***Prior to most lessons there are AP Daily Videos assigned, however not listed below. It is important that you watch these videos by highly experienced AP Chemistry Teachers to help you understand the content.**

***Topic Questions are required assignments to assess your knowledge of the different AP course elements. Although these are required, they are formative only and cannot count towards grades per College Board policy.**

***Assignments, project, labs are listed as Mastery or Above Mastery. Mastery and/or Above Mastery MUST also be earned on the final unit assessment on the AP Classroom. If not otherwise stated in the unit via assignments being marked Above Mastery, the final assessment will be the determinant of Mastery or Above Mastery for the unit.**

Course Overview

Introductory Video and Letter

Course Outcomes

Essential Units Link

1st Assignment: Teams meeting with instructor

Introduction to AP Chemistry: First things First

How to join the AP Chemistry Classroom

1st Assignment: Teams meeting with instructor

AP Chemistry Book Link to Open Stax Book (free)

AP Chemistry Instructions to Access [Chemistry: An Atoms-Focused Approach \(AP Edition\)](#)

Student Video Introduction to Labster Simulations

Link to Technical Requirements for Labster

Link to Labster Student Resources

Pre-Course (Summer) Assignment Upload Link **(This MUST be turned in within the first 2 weeks or you will be restricted from moving forward in your course)**

Week 1-2

E01 Atomic Structure and Properties

L1 P1 Scientific Notation, Units, Temperature, Volume and Density

L1 P2 Measurement, Significant Figures, Uncertainties and More (Linked to E10 SP 3.A, 5.F)

L1 P2 Assignment Virtual Measurement Activity (Linked to E10 SP 3.A, 5.F) Mastery

L2 Mole and Molar Mass Relationships TSW 1 (AP 1.1, SPQ 1A, SP 5.B)

L2 Topic Questions AP 1.1 (Skill 4.C, 5.A, 5.B)

L2 Virtual Lab Activity TSW 1 (AP 1.1, SPQ 1A) (Linked to E10 SP 2.E, 5.A, 5.B, 5.F) Mastery

L3 Elemental Composition of Pure Substances and Mixtures TSW 3 and 4 (AP 1.3,1.4, SPQ 2A, 2B, SP 2.A, 2.E, 5.A)

L3 AP Topic Questions 1.3, 1.4 (Skill 2.A, 5.A)

L3 Percent Composition of Sodium Bicarbonate in a Mixture Virtual Lab TSW 3B, 4B (AP 1.3,1.4) (Linked to E10 SP 2.D, 2.E, 2.F, 5.A, 5.F, and 6.G)

L3 Assignment 1 TSW 1, 3, and 4 (AP Chem 1.1, 1.3, 1.4 and SP 2.C) Mastery and Above Mastery

L4 Isotopes and Mass Spectroscopy of Elements TSW 2 (AP 1.2, SPQ 1.B, SP 5.D)

L4 Mass Spectroscopy Virtual Lab TSW 2B (AP 1.2) (Linked to E10 SP 5.D) Mastery

L4 Isotopes and Mass Spec Assignment TSW 2 (AP 1.2, SP 5.D) Mastery and Above Mastery

L2-4 Topic Questions AP 1.2 -1.4 (Skill 5.D)

L5 Atomic Structure and Electron Configuration TSW 5 (AP 1.5, SP 1.A)

L5 Virtual Electron Configuration Assignment TSW 5 (AP 1.5, SP 1.A) Mastery

L6 Photoelectron Spectroscopy, Coulomb's Law and Ionization Energy TSW 5 and 6 (AP 1.5, 1.6, SP 4.B)

L6 Photoelectron Spectroscopy Assignment TSW 5,6 and 7 (AP 1.5, 1.6, SP 4.B) Mastery and Above Mastery

L7 Periodic Trends and Valence Electrons TSW 7,8 (AP 1.7,1.8, SAP 2.A, 2.B, SP 4.A, 4.C)

L7 Assignment Graphing Periodic Trends TSW 7 and 8 (AP 1.7, 1.8) (Linked to E10 SP 2.D,3.A,3.C,4.A,6.B,6.F) Mastery and Above Mastery

L5-8 AP Topic Questions 1.5, 1.6, 1.7 and 1.8 (Skill 1.A, 4.A, 4.B, 4.C)

E01 AP Unit 1 MCQ Progress Check on AP Classroom

E01 AP Classroom U1 FRQ Progress Check

E01 Unit Assessment (Taken on the AP Classroom)

Week 3-4

E02 Molecular and Ionic Compound Structure and Properties

L1 Types of Chemical Bonds TSW 1 (AP 2.1, SAP 3A, SP 6.A)

L1 Types of Chemical Bonds Quick Quiz

L1 Labster Types of Chemical Bonds Lab Activity TSW 1 (AP 2.1, SAP 3A, SP 6.A) Mastery

L2 Intramolecular Forces and Potential Energy TSW 2 (AP 2.2, SAP 3B, SP 3.A)

L3 Structure of Ionic Solids, Metals and Alloys TSW 3,4 (AP 2.3, 2.4, SAP 3C, SP 4.C)

L3 Structure of Ionic Solids, Metals and Alloys Assignment TSW 3, 4 (AP 2.3, 2.4, SAP 3C, SP 4.C) Mastery

L4 Lewis Diagrams TSW 5 (AP 2.5, SAP 4A, SP 3.B)

L4 Lewis Diagrams Assignment TSW 5B (AP 2.5, SAP 4A, SP 3.B) Mastery

L1-4 Topic Questions AP 2.1-2.5 (Skill 6.A)

L5 Resonance and Formal Charge TSW 6 (AP 2.6, SAP 4B, SP 6.C)

L5 Resonance and Formal Charge Assignment TSW 6B (AP 2.6, SAP 4B, SP 6.C) Mastery

L6 Part 1 Molecular Geometry and Bond Angles TSW 7 (AP 2.7, SAP 4.C, SP 6.C)

L6 P1 Drawing Electron Dot (Lewis) Structures, Identifying Molecular Geometry & Bond Angles Assignment TSW 7 (AP 2.7, SAP 4.C, SP 6.C) Mastery

L6 Part 2 Bond Energy, Bond Order and Bond Length TSW 7 (AP 2.7, SAP 4.C, SP 6.C)

L6 Part 3 Molecular Polarity and Hybridization TSW 7 (AP 2.7, SAP 4.C, SP 6.C)

L6 Parts 1,2 and 3 Assignment TSW 7B (AP 2.7, SAP 4.C, SP 6.C) Mastery

L6 Labster: Carbon Valence, Hybridization and Bond Angles TSW 7 (AP 2.7, SAP 4.C, SP 6.C) Mastery

L5-6 Topic Questions AP 2.6-2.7 (Skill 6.C)

E02 Above Mastery Level Assignment

E02 AP Unit 2 MCQ Progress Check on AP Classroom

E02 AP Classroom U2 FRQ Progress Check

E02 Unit Assessment (Taken on the AP Classroom)

Week 5-7

E03 Intermolecular Forces and Properties

L1 Intermolecular Forces TSW 1 (AP 3.1, SAP 5.A, SP 4.D)

L1 Intermolecular Forces Assignment TSW 1 (AP 3.1, SAP 5.A, SP 4.D) Mastery

L2 Properties of Solids TSW 2 (AP 3.2, SAP 5.B and 6.C)

L2 Assignment TSW 2 (AP 3.2, SAP 5.B and 6.C) Mastery

L3 Solids, Liquids and Gases TSW 3 (AP 3.3, SP 3.C and 4.C)

L3 Assignment TSW 3 (AP 3.3, SP 3.C and 4.C) Mastery

L4 P1 Ideal Gases TSW 4 (AP 3.4)

L4 P2 Kinetic Molecular Theory TSW 5 (AP 3.5)

L4 P2 Assignment TSW 5 (Linked to E10 SP 4.A) Mastery

Labster: Ideal Gas Law: Build your own temperature scale TSW 3,4 (Linked to E10 SP 3.C, 4.A, 4.C and 5.C) Mastery

L4 P3 Deviations from Ideal Gas Law TSW 6 (AP 3.6)

L1-4 Topic Questions AP 3.1-3.6

L5 Solutions and Mixtures TSW 8 and 9 (AP 3.7, 3.8, SPQ 3.A and 3.B, SP 3.C and 5.F)

L5 Solutions and Mixtures Assignment TSW 8 and 9 (AP 3.7, 3.8, SPQ 3.A and 3.B, SP 3.C and 5.F) Mastery

L6 Separation of Solutions and Mixtures Chromatography TSW 10 (AP 3.9)

Labster Simulation: Thin Layer Chromatography TSW 10 (Linked to E10 SP 2.C, 2.D, 2.E)

Mastery

L7 Solubility TSW 10 (AP 3.9)

L8 Electromagnetic Spectrum, Spectroscopy and Photoelectric Effect TSW 11 and 12 (AP 3.11 and 3.12, SAP 8.A and 8.B, SP 4.A and 5.F)

L8 Assignment Electromagnetic Spectrum, Spectroscopy and Photoelectric Effect TSW 11 and 12 (AP 3.11 and 3.12, SAP 8.A and 8.B, SP 4.A and 5.F) Mastery

L9 Beer Lambert Law TSW 13 (AP 3.13, SAP 8.C, SP 2.E)

L9 Beer Lambert Law Assignment TSW 13 (AP 3.13, SAP 8.C, SP 2.E) Mastery

Labster: Spectrophotometry: Learn the Beer Lambert Law with Absorption Experiments

TSW 13 (AP 3.13, SAP 8.C, SP 2.E) Mastery

L5-9 Topic Questions AP 3.7-3.13

E03 Unit Review Practice Problems

E03 AP Unit 3 MCQ Progress Check on AP Classroom

E03 AP 3 FRQ Progress Check on AP Classroom

E03 Final Assessment

E03 Final Grade

Week 8-10

E04 Chemical Reactions

L1 Introduction to Chemical Reactions TSW 1 and 2 (AP 4.1, 4.2, TRA 1.A, 1.B)

L1 Introduction to Chemical Reactions Assignment TSW 1 (AP 4.1, TRA 1.A) Mastery

L1 Introduction to Chemical Reactions Assignment 2 TSW 2 (AP 4.2, TRA 1.B) Mastery

L2 Particulate Models, Physical and Chemical Changes TSW 3 and 4 (AP 4.3, 4.4, TRA 1.C, 1.D, SP 3.B) Mastery

L2 Particulate Models, Physical and Chemical Changes Assignment 1 TSW 3 (AP 4.3, TRA 1.C, SP 3.B, 3.C) Mastery

L2 Particulate Models, Physical and Chemical Changes Assignment 2 TSW 4 (AP 4.4, TRA 1.D, SP 3.B, 3.C) Mastery

L3 Stoichiometry TSW 5 (AP 4.5, SPQ 4.A, SP 5.C)

L3 Stoichiometry Assignment TSW 5 (AP 4.5, SPQ 4.A, SP 5.C) Mastery

Stoichiometry PhET Lab Simulation TSW 5 (AP 4.5, SPQ 4.A, SP 5.C) Mastery and Above

L1-3 (AP 4.1-4.5) Topic Questions on AP Classroom

L4 Part 1 Types of Chemical Reactions: Looking a little deeper into Acid-Base Reactions TSW 7 and 8 (AP 4.7, 4.8, TRA 2.A, 2.B, SP 1.B)

L4 Part 1 Types of Reactions: Acids and Bases TSW 7 and 8 (AP 4.7, 4.8, TRA 2.A, 2.B, SP 1.B, 5.E) Mastery

L4 Part 2 Types of Chemical Reactions: Looking a little deeper into Oxidation-Reduction Reactions TSW 7 and 9 (AP 4.7, 4.9, TRA 2.A, 2.C, SP 5.E) Mastery

L4 Part 2 Types of Chemical Reactions: Looking a little deeper into Oxidation-Reduction Reactions Assignment 1 TSW 7 and 9 (AP 4.7, 4.9, TRA 2.A, 2.C, SP 5.E) Mastery

L4 Part 2 Types of Chemical Reactions: Looking a little deeper into Oxidation-Reduction Reactions Assignment 2 TSW 7 and 9 (AP 4.7, 4.9, TRA 2.A, 2.C, SP 5.E) Mastery

L4 (AP 4.7, 4.8, 4.9) Topic Questions

L5 Titrations TSW 6 (AP 4.6, SPQ 4.B, SP 3.A)

L5 Titrations Assignment TSW 6 (AP 4.6, SPQ 4.B, SP 3.A) Mastery

Labster: Titration: Neutralize an acid lake contamination TSW 6 (AP 4.6, SPQ 4.B, SP 2.C, 3.A, 5.F)

Interactive Titration Lab Simulation TSW 6 (AP 4.6, SPQ 4.B, SP 2.F, 3.A) Above Mastery

L5 (AP 4.6) Topic Questions

AP Chemistry Unit 4 Review (College Board)

AP Chemistry MCQ Review on how to answer AP Questions

E04 MCQ Progress Check on AP Classroom

E04 FRQ Progress Check on AP Classroom

E04 Final Assessment (On the AP Classroom)

E04 Final Grade

Week 11-13

E05 Kinetics

L1 Introduction to Kinetic Theory

L2 Reaction Rates TSW 1 (AP 5.1, TRA 3.A, SP 6.E)

L2 Reaction Rates Assignment TSW 1 (AP 5.1, TRA 3.A, SP 6.E) Mastery

L3 Introduction to Rate Law TSW 2 (AP 5.2, TRA 3.B, SP 5.C)

L3 Introduction to Rate Law TSW 2 (AP 5.2, TRA 3.B, SP 5.C) Mastery

L4 Concentration Changes over Time TSW 3 (AP 5.3, TRA 3.C, SP 5.B)

L4 Concentration Changes over Time Assignment TSW 3 (AP 5.3, TRA 3.C, SP 5.B) Mastery

L5 Elementary Reactions TSW 5 (AP 5.4, TRA 4.A)

L5 Elementary Reactions Assignment TSW 5 (AP 5.4, TRA 4.A) Mastery

L1-5 (AP 5.1-5.4) Topic Questions

L6 Kinetic Theory and Collision Model TSW 5 (AP 5.5, TRA 4.B, SP 6.E)

L6 Collision Model Assignment TSW 5 (AP 5.5, TRA 4.B, SP 6.E) Mastery

L7 Reaction Energy Profile TSW 6 (AP 5.6, TRA 4.C, SP 3.B)

L7 Reaction Energy Profile Assignment TSW 6 (AP 5.6, TRA 4.C, SP 3.B) Mastery

L8 Reaction Mechanisms and Rate Law TSW 7, 8 and 9 (AP 5.7, 5.8, TSW 5.A, 5.B, SP 1.B, 5.B)

L8 Reaction Mechanisms and Rate Law Assignment 1 TSW 7, 8 and 9 (AP 5.7, 5.8, TSW 5.A, 5.B, SP 1.B, 5.B) Mastery

L8 Reaction Mechanisms and Rate Law Assignment 2 TSW 7, 8 and 9 (AP 5.7, 5.8, TSW 5.A, 5.B, SP 1.B, 5.B) Mastery

L9 Steady State Approximations TSW 9 (AP 5.9, TSW 5.C, SP 5.B)

L9 Steady State Approximations Assignment TSW 9 (AP 5.9, TSW 5.C, SP 5.B) Mastery

L6-9 (AP 5.5-5.9) Topic Questions on AP Classroom

L10 Multistep Energy Profiles and Catalysts TSW 10 and 11 (AP 5.10, 5.11, TRA 5.D, ENE 1.A, SP 3.B, 6.E)

L10 Multistep Energy Profiles Assignment 1 TSW 10 (AP 5.10, TRA 5.D, SP 3.B) Mastery

L10 Catalysts Assignment 2 TSW 11 (AP 5.11, ENE 1.A, SP 6.E) Mastery

L10 (AP 5.10, 5.11) Topic Questions on AP Classroom

Labster: Reaction Kinetics: The Essentials TSW 1,2 6 (AP 5.1, 5.2, 5.3, 5.6, TRA 3.A, 3.B, 3.C, 4.C, SP 5.C, 5.B) Mastery

E05 Kinetics Lab Simulation Activity TSW 12 (1-6) (AP 5.1, 5.2, 5.3, 5.5, 5.6, TRA 3.B, 3.C, 4.B, 4.C)

Connected to E10 (SP 3.B, 5.A, 5.B, 5.C, 5.F, 6.E, 6.F) (Mastery)

E05 Kinetics Design Lab Simulation Activity TSW 12 (1-6) (AP 5.1, 5.2, 5.3, 5.5, 5.6, TRA 3.B, 3.C, 4.B, 4.C) Connected to E10 (SP 3.B, 4.A, 4.B, 5.A, 5.B, 5.C, 5.F, 6.A, 6.B, 6.C, 6.D, 6.E, 6F, 6.G) (Above Mastery)

E05 MCQ Progress Check on the AP Classroom

E05 FRQ Progress Check on the AP Classroom

E05 Final Assessment on the AP Classroom

E05 Final Grade

Week 14-15

E06 Thermodynamics

L1 Endothermic and Exothermic Changes and Energy Diagrams TSW 1 and 2 (AP 6.1, 6.2, ENE 2.A, 2.B, SP 3.A, 6.B)

L1 Energy Diagrams Assignment TSW 2 (AP 6.2, ENE 2.B, SP 6.B) Mastery

L2 Heat Transfer, Thermal Equilibrium, Heat Capacity and Calorimetry TSW 3 and 4 (AP 6.3, 6.4, ENE 2.C, 2.D, SP 2.D, 6.E)

L2 Heat Capacity and Calorimetry Assignment TSW 4 (AP 6.4, ENE 2.D) Mastery

L3 Energy of Phase Changes TSW 5 (AP 6.5, ENE 2.E, SP 1.B)

Labster Heating Curves and Phase Changes TSW 5 (AP 6.5, ENE 2.E, SP 1.B, 4.B, 4.B) Mastery

L3 Energy of Phase Changes Assignment TSW 5 (AP 6.5, ENE 2.E, SP 1.B) Mastery

L4 Enthalpy of Reactions and Bond Enthalpies TSW 6 and 7 (AP 6.6, 6.7, ENE 2.F, 3.A SP 1.B, 5.F)

L4 Enthalpy of Reactions Assignment TSW 6 (AP 6.6, ENE 2.F, SP 1.B) Mastery

L4 Bond Enthalpies Assignment TSW 7 (AP 6.7, ENE 3.A SP 5.F) Mastery

L1-4 Topic Questions (AP Classroom)

L5 Enthalpy of Formation TSW 8 (AP 6.8, ENE 3.B, SP 5.F)

L5 Enthalpy of Formation TSW 8 (AP 6.8, ENE 3.B, SP 5.F) Mastery

L6 Hess's Law TSW 9 and 10 (AP 6.9, ENE 3.C, 3.D, SP 5.A)

L6 Hess's Law TSW 9 and 10 (AP 6.9, ENE 3.C, 3.D, SP 5.A) Mastery

L4 and 5 Topic Questions (AP Classroom)

E06 Enthalpy of Reactions and Hess's Law Lab Activity TSW 4, 6, 8, 9, 10, 11 (Linked to E10) (AP 6.4, 6.6, 6.8, 6.9, ENE 2.D, 2.F, 3.B, 3.C, 3.D, SP 2.D, 2.E, 3.A, 4.B, 5.A, 5.F, 6.F, 6.G) Mastery and Above Mastery

E06 Unit 6 Review

E06 MCQ Progress Check (AP Classroom)

E06 FRQ Progress Check (AP Classroom)

E06 Final Assessment (AP Classroom)

E06 Final Grade

Week 16-19

E07 Equilibrium

L1 Introduction to Equilibrium and Direction of Reversible Reactions TSW 1 and 2 (AP 7.1, 7.2, TRA 6.A, 6.B)

L1 Introduction to Equilibrium Assignment TSW 1 (AP 7.1, TRA 6.A, SP 6.B) Mastery

L1 Direction of Reversible Reactions Assignment TSW 2 (AP 7.2, TRA 6.B, SP 4.D) Mastery

L2 Reaction Quotient and Equilibrium Constant TSW 3, 4 and 5 (AP 7.3, 7.4, 7.5 TRA 7.A, 7.B, 7.C SP 3.A, 5.C, 6.B)

L2 Reaction Quotient and Equilibrium Constant Assignment TSW 3 (AP 7.3, TRA 7.A) Mastery

- L2 Calculating the Equilibrium Constant Assignment TSW 4 (AP 7.4, TRA 7.B) Mastery
- L2 Magnitude of the Equilibrium Constant Assignment TSW 5 (AP 7.5, TRA 7.C, SP 3.C) Mastery
- L3 Properties of the Equilibrium Constant TSW 6 (AP 7.6, TRA 7.D, SP 5.A)
 - L3 Properties of the Equilibrium Constant Assignment TSW 6 (AP 7.6, TRA 7.E) Mastery
 - L1-3 (AP 7.1 - 7.6) Topic Questions
- L4 Calculating Equilibrium Concentrations TSW 7 (AP 7.7, TRA 7.E)
 - L4 Calculating Equilibrium Concentrations Assignment TSW 7 (AP 7.7, TRA 7.E) Mastery
- L5 Representations of Equilibrium TSW 8 (AP 7.8, TRA 7.F, SP 3.C)
 - L5 Representations of Equilibrium Assignment TSW 8 (AP 7.8, TRA 7.F, SP 3.C) Mastery
- L6 Le Chatlier's Principle and Reaction Quotient TSW 9 and 10 (AP 7.9, 7.10, TRA 8.A, 8.B, SP 5.F)
 - L6 Introduction to Le Chatlier's Principle Assignment TSW 9 (AP 7.9, TRA 8.A, SP 3.A, 5.C) Mastery
 - L6 Reaction Quotient and Le Chatlier's Principle Assignment TSW 10 (AP 7.10, TRA 8.B) Mastery
 - L4-6 (AP 7.7-7.10) Topic Questions on AP Classroom
- L7 Solutions and the Common Ion Effect TSW 11 and 12 (AP 7.11, 7.12, SPQ 5.A, 5.B)
 - L7 The Common Ion Effect Assignment TSW 10 (AP 7.12, SPQ 5.B) Mastery
 - L7 Introduction to Solubility in Equilibria Assignment TSW 11 (AP 7.11, SPQ 5.A) Mastery
- E07 Labster: Equilibrium TSW 1-10 (Linked to E10) (AP 7.1 -7.6, 7.9, 7.10, TRA 6, SP 3.A, 4.D, 5.A, 5.C, 5.D, 6.D, 6.F) Mastery
- L8 pH and Solubility and Free Energy of Dissolution TSW 13 and 14 (AP 7.13, 7.14, SPQ 5.C, 5.D 7.D)
 - L8 pH and Solubility and Free Energy of Dissolution Assignment TSW 13 and 14 (AP 7.13, 7.14, SPQ 5.A, 5.B) Mastery
 - L7-8 (AP 7.11-7.14) Topic Questions on AP Classroom
- E07 Equilibrium Lab Simulation TSW 1-10 (AP 7.10-7.10, SP 1.A, 2.D, 3.A, 3.C, 4.A, 4.C, 4.D, 5.C, 6.A, 6.B, 6.C, 6F) Mastery
- E07 Equilibrium A level Lab Design TSW 1-10 (AP 7.10-7.10, SP 1.A, 2.A, 2.B, 2.C, 2.D, 3.A, 3.C, 4.A, 4.D, 5.C, 6.A, 6.B, 6.C) Above Mastery
- E07 MCQ Progress Check On AP Classroom
- E07 FRQ Progress Check on AP Classroom
- E07 Equilibrium Unit Review
- E07 Final Assessment (AP Classroom)
- E07 Final Grade

Week 20-22

E08 Acids and Bases

- L1 Introduction to Acids and Bases and Calculating pH and pOH TSW 1 and 2 (AP 8.1, 8.2, SAP 9.A, 9.B, SP 5.B)
 - L1 Introduction to Acids and Bases and Calculating pH and pOH Assignment TSW 1,2 (AP 8.1, 8.2, SAP 9.A, 9.B, SP 5.B) Mastery
 - Labster: Acids and Bases TSW 1 and 2 (Linked to E10) (AP 8.1, 8.2, SAP 9.A, 9.B, SP 4.A, 4.C, 4.D, 5.B) Mastery
- L2 Weak Acid and Base Equilibria TSW 3 (AP 8.3, SAP 9.C, SP 8.C)
 - L2 Weak Acid and Base Equilibria Assignment TSW 3 (AP 8.3, SAP 9.C, SP 5.C) Mastery
- L3 Acid-Base Reactions and Buffers TSW 4 (AP 8.4, SAP 9.D, SP 5.F)
 - L3 Acid-Base Reactions and Buffers Assignment TSW 4 (AP 8.4, SAP 9.D, SP 5.E, 5.F) Mastery

Labster: Advanced Acids and Bases TSW 3, 4, (Linked to E10) (AP 8.3, 8.4, SAP 9.C, 9.D, SP 1.A, 4.A, 4.C, 4.D, 5.B, 5.E) Mastery
L1-3 (AP 8.1-8.4) Topic Questions on AP Classroom
L4 Acid Base Titrations TSW 5 (AP 8.5, SAP 9.E, 10.A, SP 5.D)
L4 Acid Base Titrations Assignment TSW 5 (AP 8.5, SAP 9.E, SP 2.E, 5.D, 5.F) Mastery
L5 Molecular Structure of Acids and Bases TSW 6 (AP 8.6, SAP 9.F, SP 6.C)
L5 Molecular Structure of Acids and Bases Assignment TSW 6 (AP 8.6, SAP 9.F, SP 1.B, 6.C) Mastery
L6 pH and pKa TSW 7 (AP 8.7, SAP 10.A, SP 5.F)
L6 pH and pKa Assignment TSW 7 (AP 8.7, SAP 10.A, SP 5.F) Mastery
E08 Interactive Titration Lab Simulation TSW 5 (AP 8.5, SAP 9.E, SP 2.F, 3.A, 5.F) Mastery
L4-6 (AP 8.4-8.7) Topic Questions on AP Classroom
L7 Buffers, Buffer Capacity and Henderson-Hasselbalch Equation TSW 8, 9 and 10 (AP 8.8, 8.9, 8.10, SAP 10.B, 10.C, 10.D, SP 5.F, 6.D)
L7 Buffers Assignment TSW 8 (AP 8.8, SAP 10.B, SP 6.D) Mastery
L7 Henderson-Hasselbalch Equation Assignment TSW 9 (AP 8.9, SAP 10.C, SP 5.F) Mastery
L7 Buffer Capacity Assignment TSW 10 (AP 8.10, SAP 10.D, SP 5.F) Mastery
L7 (AP 8.8-8.10) Topic Questions on AP Classroom
Review: AP Chemistry 8.4, 8.7-8.9 Acid Base Reactions, Buffers, pH, pKa, and Henderson Hasselbalch
E08 MCQ Progress Check on AP Classroom
E08 FRQ Progress Check on AP Classroom
E08 Final Assessment on AP Classroom
E08 Final Grade

Week 23-25

E09 Applications of Thermodynamics

L1 Introduction to Entropy TSW 1 (AP 9.1, ENE 4.A, SP 1.A)
L1 Introduction to Entropy Assignment TSW 1 (AP 9.1, ENE 4.A, SP 1.A) Mastery
L2 Absolute Entropy and Entropy Change TSW 2 (AP 9.2, ENE 4.B, SP 5.F)
L2 Absolute Entropy and Entropy Change Assignment TSW 2 (AP 9.2, ENE 4.B, SP 5.F) Mastery
L3 Gibbs Free Energy and Thermodynamic Favorability TSW 3 (AP 9.3, ENE 4.C, SP 5.F, 6.E)
L3 Gibbs Free Energy and Thermodynamic Favorability Assignment TSW 3 (AP 9.3, ENE 4.C, SP 5.F, 6.E) Mastery
L4 Thermodynamics, Kinetic Control, Free Energy and Equilibrium TSW 4 and 5 (AP 9.4, 9.5, ENE 4.D, 5.A)
L4 Thermodynamics and Kinetic Control Assignment TSW 4 (AP 9.4, ENE 4.D) Mastery
L4 Free Energy and Equilibrium Assignment TSW 5 (AP 9.5, ENE 5.A) Mastery
L1-4 (AP 9.1 to 9.5) Topic Questions on AP Classroom
Labster: Basic Chemistry Thermodynamics: Solve the challenge of sorting renewable energy TSW 1, 2, 3 and 5 (AP 9.1, 9.2, 9.3, 9.5, ENE 4.A, 4.B, 4.C, 5.A, SP 4.A, 4.B, 5.F, 6.C, 6.D, 6.E).
(Also – Review of Kinetics AP Unit 6 concept) Mastery
L5 Coupled Reactions TSW 6 (AP 9.6, ENE 5.B)
L5 Coupled Reactions Assignment TSW 6 (AP 9.6, ENE 5.B) Mastery
L6 Galvanic (Voltaic) and Electrolytic Cells TSW 6, 7, 8 (AP 9.7, ENE 6.A)

L6 Galvanic (Voltaic) and Electrolytic Cells Assignment TSW 6, 7, 8 (AP 9.7, ENE 6.A, SP 1.A, 3.B, 4.C, 5.E) Mastery
Labster Redox Reactions Discover how batteries work TSW 7 (AP 9.7, ENE 6.A, SP 2.F, 4.A, 6.D) (Includes Review of Redox Reactions) Mastery
L7 Cell Potential and Free Energy TSW 8 (AP 9.8, ENE 6.B)
L7 Cell Potential and Free Energy Assignment TSW 8 (AP 9.8, ENE 6.B) Mastery
L5-7 (AP 9.6-9.8) Topic Questions on AP Classroom
L8 Cell Potential Under Nonstandard Conditions TSW 9 (AP 9.9, ENE 6.C)
L8 Cell Potential Under Nonstandard Conditions Assignment TSW 9 (AP 9.9, ENE 6.C) Mastery
L9 Electrolysis and Faraday's Law TSW 10 (AP 9.10, ENE 6.D)
L9 Electrolysis and Faraday's Law Assignment TSW 10 (AP 9.10, ENE 6.D) Mastery
Labster: Electrolysis TSW 10 (AP 9.10) Learning Activity
L8-9 (AP 9.9, 9.10) Topic Questions on AP Classroom
E09 Virtual Lab: Electrochemical Cells TSW (AP 9.6, 9.7, 9.7, 9.9, 9.10, ENE 5.B, 6.A, 6.C, 6.D, SP 2.F, 4.D, 5.F, 6.D) Mastery and Above Mastery
E09 MCQ Progress Check on the AP Classroom
E09 FRQ Progress Check on AP Classroom
E09 Final Assessment
E09 Final Grade

Week 26 until Exam

E10 Part 1: Exam Prep

AP Exam Information
AP College Board Exam Tips
AP Chemistry Periodic Table and Equations and Constants Sheets
Thou Shalt Not Forget Document
Varsity Tutors FREE AP Chem Diagnostic and Practice Exams

AP Chemistry MOCK MCQ Exam - required

AP Chemistry MOCK FRQ Exam - required

AP Practice Exam on the AP Classroom - required

E10 Exam Prep and Review Sessions:

Strategies for taking the MCQ Exam without a Calculator Session 1
How to answer Challenging Conceptual MCQs Session 2
Experiment Based FRQ: Calorimetry and Beer's Law Session 3
Examining Coulomb's Law, Periodicity and Intermolecular Forces Session 4
Understanding Acid Base Equilibrium Session 5
Experimental Methods and Analysis of FRQ Session 6
Everything you need to know about Electrochemistry Session 7
Free Response Medley and Exam Strategies Session 8
AP Exam Free Response Questions Review

E10 Unit Specific Exam Prep

Unit 1 Atomic Structure
Unit 2 Molecular and Ionic Compounds Structure and Properties
Unit 3 Intermolecular Forces and Properties
Unit 4 Chemical Reactions

Unit 5 Kinetics
Unit 6 Thermodynamics
Unit 7 Equilibrium
Unit 8 Acids and Bases
Unit 9 Applications of Thermodynamics

Week: Covered throughout the course

E10 Part 2: Scientific Practices (Will be closed once all Science Practices have been Mastered)

AP Chemistry Scientific Practices

AP Chem Science Practice 1: Models and Representations

AP Chem Science Practice 2: Question and Method

AP Chem Science Practice 3: Representing Data and Phenomena

AP Chem Science Practice 4 Model Analysis

AP Chem Science Practice 5 Mathematical Routines

AP Chem Science Practice 6 Argumentation

E10 Final Grade

Tentative Course Schedule

Each unit is divided into weeks on the moodle course to help guide you through. Within the syllabus, I have added time within a few units so that you have a little extra time for studying, resubmissions, and extra time for projects or labs as needed.

Week 1-2: Course Overview and E01 Atomic Structure and Properties

Week 3-4: E02 Molecular and Ionic Compound Structure and Properties

Week 5-7: E03 Intermolecular Forces and Properties

Week 8-10: E04 Chemical Reactions

Week 11-13: E05 Kinetics

Week 14-15: E06 Thermodynamics

Week 16-18: E07 Equilibrium

Week 19-21: E08 Acids and Bases

Week 22-24: E09 Applications of Thermodynamics

Week 25 to end of course: E10 Exam Prep and Science Practices

Attendance Policy

5 periods per week, (equivalent of 225 minutes per week)

Students are expected to attend and participate in all synchronous meetings

Students are expected to submit work daily, when assignments are submitted in bulk feedback time increases (1 assignment graded per day).

Classroom Behavior expectations

For synchronous communication:

School appropriate attire, Camera on at all times, Microphone muted on login

For asynchronous communication:

Be polite and respectful in responses to forum posts of other students, bullying will not be tolerated.

Upload only appropriate pictures, not sure about the wording

Academic honesty

You are expected to submit your own work, as this is not only academic honesty, but also important in determining your mastery of the content. When using researched resources, you are expected to give credit in the appropriate MLA or APA format.

The purpose of learning and mastering content is for you to use and show your knowledge of the content so that you can be successful in future courses and endeavors. Although it might not be apparent immediately, failure to produce your own work will eventually show in your ability to succeed in future content, as content builds on prior knowledge and learning. The course is designed for you to learn the content prior to taking any assessments or completing any projects for assessment so that you will consistently be prepared to be successful.

Other Information

AP Chemistry Exam = Monday May 1, 2023

**** Update: Calculators will be allowed on both MCQ and FRQ Exams this year**