

AP CHEMISTRY

Ivy Collegiate School

2020-2021

Instructor: Brian Lee	Time: MTuW 10:10 – 11:10
Email: blee@ivycollegiateschool.org	Place: 806 (Science Lab).

Course References: This is a list of various interesting and useful books and online resources that were used in the construction of the course. You are not required to purchase all of these (only those noted as such), but they may be useful for occasional consultation. (Note: They are available in the restricted library.)

- Jaehoon Lee, *IB Chemistry*, GuruMe, 1st ed., 2019. REQUIRED
- Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. Bursten, Catherine J. Murphy, and Patrick M. Woodward, *Chemistry: The Central Science*, Pearson, 13th ed., 2019.
- Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. Bursten, Catherine J. Murphy, and Patrick M. Woodward, *Laboratory Experiments for Chemistry: The Central Science*, Pearson, 2019.
- Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. Bursten, Catherine J. Murphy, and Patrick M. Woodward, *Active Reading Guide for Chemistry: The Central Science*, Pearson, 2019.
- Neil D. Jespersen, and Pamela Kerrigan, *Barron's AP Chemistry*, Barrons Educational Series, 9th ed., 2018.

Objectives: This course begins with an introduction to the properties of matter, measurement principles, and dimensional analysis. Students are then taught the atomic theory of matter and the methods of performing chemical calculations, stoichiometry. Students perform labs involved aqueous solutions, acid-base reactions, and redox reactions. They then learn about molecular bonding, the VSEPR model, chemical reactions, kinetics, and chemical equilibrium. The course ends with an exploration of the core concepts of thermodynamics, including the laws of thermodynamics, entropy, and free energy. This is a lab-based course requiring training in safety and handling of volatile substances. Some mathematical pre-requisites are necessary. This course is comprised of six "Big Ideas":

- BIG IDEA #1: Atoms & Elements
- BIG IDEA #2: Structure & Properties of Matter
- BIG IDEA #3: Chemical Reactions
- BIG IDEA #4: Kinetics
- BIG IDEA #5: Thermodynamics
- BIG IDEA #6: Equilibrium

Co-/Prerequisites: Precalculus; Chemistry I is recommended but not required.

Notes on AP courses: AP courses culminate in an examination May with scores ranging from 1 to 5 (5 - Extremely well-qualified; 4 - Well-qualified; 3 - Qualified; 2 - Somewhat qualified; 1 - Not qualified).

Students are expected to devote additional time beyond their normal class and homework hours to preparing for this examination. While time for instructor-led review is always allotted during the Spring semester, it is important that students begin their review independently and early. At ICS, AP courses have an additional component in the requirement of the completion of a Capstone Project at the end of the year (in lieu of a traditional Final Examination). More details regarding the Capstone Project(s) may be found below.

AP Chemistry Course Outline:

Week One	Properties of Matter, Measurement
Week Two	Atomic theory of matter Molecule assembly (LAB)
Week Three	Stoichiometry
Week Four	Acid-base reactions, redox reactions Concentration of acetic acid in vinegar (LAB)
Week Five	Quantum mechanical models
Week Six	Periodic trends
Week Seven	Chemical bonding
Week Eight	REVIEW
Week Nine	Liquids and intermolecular forces of attraction
Week Ten	Types of solids
Week Eleven	Solutions and solubility Preparing solutions (LAB)
Week Twelve	Chemical kinetics and reaction mechanisms
Week Thirteen	Chemical Equilibrium and Le Chatelier's Principle
Week Fourteen	REVIEW
Week Fifteen	Acid-base equilibria
Week Sixteen	Gases Virtual gas laws simulation (LAB)
Week Seventeen	Thermochemistry and chemical thermodynamics Calorimetry (LAB)
Week Eighteen	Electrochemistry
Week Nineteen	Transition metals
Week Twenty to Thirty-two	SPRING REVIEW PERIOD
Week Thirty-three to Thirty-seven	CAPSTONE RESEARCH
Week Thirty-eight	CAPSTONE PRESENTATIONS

Grading Policy: Homework and quizzes (60%), Finals and Project (40%)

Capstone Project: The Capstone projects are designed to give you the opportunity to showcase (beyond the examination) what you have learned and the skills you have mastered as part of the course. While every project assignment may be different in scope, target, grading, and type of organization, each is intended to require you to “dig deep” and impress us with your creativity. For this set of courses, you are required to submit a project that captures the full-depth of your knowledge of select topic(s) from the course. Examples may include writing an original research paper related to a topic you have learned in class, producing a 30-minute video tutorial on a select topic, or create a new lab demonstration/lesson for future classes. Rubrics will be available in the Spring semester.

Important Dates:

Final Examination, Semester IDec 22, 2020
AP ExaminationMay 7, 2021
Capstone Deadline TBD

Course Policy:

- Students must submit a daily notebook, worked exercises, and keep a lab journal for review.

Class Policy:

- Regular attendance is essential and expected.
- All assignments should be submitted on time and with work shown.

Academic Honesty: Students are expected to abide by the policies regarding Academic Honesty as laid out in the ICS Student Handbook. Any violations will be forwarded for administrative review and the possible imposition of academic penalties.