

AP Chemistry Summer Review

Welcome to AP Chemistry. I can't wait to do great labs and talk chemistry this year. Here is an overview and some practice items for you to assess your present mastery and a glimpse of what is to come. Remember summer is also to relax and rejuvenate, so enjoy yourselves and don't stress. You love chemistry already or you wouldn't have chosen to take this course.

AP Chemistry is a college-level general chemistry course, intended to be taken as a second-year high school chemistry course. It is assumed that prior to taking AP Chemistry, you have successfully completed one year of high school chemistry. Due to the intense nature of the course curriculum, and the limited amount of time we have each day for covering the material, it is expected that you have a strong grasp of the first-year chemistry topics shown below. If you need additional practice with these topics, please refer to your notes from your Chemistry or Honors Chemistry class. You can also refer to various online resources such as [Khan Academy](#) or [Bozeman Science](#).

There is no physical textbook for this class. Two different textbooks are provided for you in pdf format as resources below. Use whichever one you like best. We will use MasteringChemistry online modules to practice.

- [Chemistry, Brown et. al. 12th edition](#)
- [Chemistry, Zumdahl and Zumdahl, 7th edition](#)

Topics to have been mastered from your first-year chemistry course:

Chemical Foundations	Scientific method, measurements, lab techniques, metric/SI system, exact/inexact numbers, significant figures, scientific notation, density, dimensional analysis (unit conversions)
Atoms, Molecules, and Ions	Classification of matter, periodic table, structure of the atom, electron configurations, formation of ions
Compounds and Bonding	Types of compounds and chemical bonds, electronegativity, bond polarity, Lewis structures, formulas and names of ionic and molecular compounds, intermolecular forces of attraction
Chemical Reactions	Types of chemical reactions, balancing chemical equations, interpreting chemical equations, energy changes in chemical reactions
Stoichiometry	Molar mass, mole conversions, molar relationships in chemical equations, limiting reactants, theoretical yield, percent yield
Solutions	Solubility, concentration, molarity, dilution
Gases	Pressure, kinetic molecular theory, ideal gas law
Equilibrium	Reversible reactions, equilibrium constants (K_c)
Thermochemistry and Thermodynamics	$q = mc\Delta T$, enthalpy (ΔH), entropy (ΔS) , Gibbs free energy (ΔG) , and reaction spontaneity (these are new topics to all)
Acids and Bases	Arrhenius acids and bases, Bronsted-Lowry acids and bases, strong and weak acids, pH

The data table lists all the chemistry concepts above to be successful in AP Chemistry. Most of you just covered them this past year so they should be fresh in your head. If you have not yet had a chemistry course, please take time this summer to familiarize yourself with those topics. While we will do *some* review of these topics as we begin each unit, the review will be quick since the expectation is that you already know the basics. This course is NOT about learning the basics of chemistry, but rather builds on the basics, and

increases your depth of understanding of chemical concepts. Emphasis is placed on understanding the concepts and being able to explain observations/data. It will also be highly math intensive, so make sure you have a good scientific or graphing calculator.

AP Chemistry Summer Review

Things You Absolutely Must Know Prior to the Start of Class:

The topics listed in the table on page 1 are foundational concepts you need to master as we progress throughout the course. I do not expect you to relearn all this information over the summer. However, there are certain topics that are essential to have mastered *prior to* beginning the course in August.

- ⇒ It is essential that you understand scientific notation, know your significant figures rules, know the names, formulas, and charges of monatomic and polyatomic ions, can write formulas and names for ionic compounds, are proficient in dimensional analysis, understand the structure of the atom, know the basic organization of the periodic table and the information it provides, be able to write and interpret balanced chemical equations, and perform stoichiometric calculations. Besides your textbook, additional resources can be found below.

SCIENTIFIC NOTATION

You must be able to interpret numbers expressed in scientific notation with respect to their magnitude, and be able to convert between scientific notation and ordinary decimal numbers.

The resources available to review these skills are:

1. [Scientific Notation video](#)

SIGNIFICANT FIGURES

You need to be able to recognize how many significant figures a number contains (including whether a zero in a measured number is significant), and to report measured numbers and numbers resulting from calculations with the proper number of significant figures.

The resources available to review these skills are:

1. [Significant Figures in Measurement and Calculations](#)
2. [Significant Figures Practice Problems](#) and [Answer Key](#)

Once you have reviewed this information, take the [practice quiz](#). **Record your score: /20**

COMMON IONS

You need to memorize the formulas, charges, and names of monatomic ions as well as common polyatomic ions, and be able to write the names and formulas of ionic compounds formed from them.

The resources available to review these skills are:

1. [Common Ions and Their Charges](#) - you don't need to memorize all the polyatomics on this list! You should know these: ammonium, acetate, hydroxide, sulfate, hydrogen sulfate, nitrate, nitrite, phosphate, hydrogen phosphate, cyanide, peroxide, carbonate, hydrogen carbonate, permanganate
2. [AP Ion Flashcards](#)
3. [Combining Ions](#) and [Answer Key](#)
4. [Writing Formulas for Ionic Compounds](#) and [Answer Key](#)

5. [Naming Ionic Compounds](#) and [Answer Key](#)

Once you have reviewed this information, challenge yourself and play the “Concentration” games below.

- [Monatomic Ion Concentration Game](#) *record your best time:*
- [Polyatomic Ion Concentration Game](#) *record your best time:*

These concepts represent the “math stuff” you need to know as you begin AP Chemistry.

DIMENSIONAL ANALYSIS

Available resources:

1. [Metric Unit Conversion video](#)
2. [Dimensional Analysis](#) and [Answer Key](#)

THE MOLE AND MOLE CONVERSIONS

Available resources:

1. [Mole/mass conversions video](#)
2. [Mass/mole/particle conversions video](#)
3. [Molar Mass](#)
4. [Mole Conversions](#) and [Answer Key](#)
5. [Molar Ratios](#) and [Answer Key](#)

STOICHIOMETRY

Available resources:

1. [Limiting reactant video](#)
2. [Theoretical and percent yield video](#)
3. [Stoichiometry](#) and [Answer Key](#)
4. [Limiting Reactant](#) and [Answer Key](#)
5. [Percent Yield](#) and [Answer Key](#)

HODGEPODGE

The rest of the information you need to know prior to the course starting is grouped together under this part. It includes knowing the structure and composition of an atom, using the periodic table for basic information about elements, balancing and interpreting chemical equations, and expressing solution concentration in molarity. The resources shown below contain a brief review of each topic, along with practice problems.

The resources available to review these skills are:

- | | |
|--|---|
| 1. Isotope Notation and Answer Key | 4. Balancing Equations and Answer Key |
| 2. Isotope Table and Answer Key | 5. Word Equations |
| 3. Periodic Table Terms and Answer Key | 6. Molarity and Answer Key |

All resources are hyperlinked to worksheets. Answer keys for worksheets are attached when available. All of these resources can be found in the 2021-2022 AP Chemistry folder that I will share with you on Google Classroom once the course roster is available.

These are highly recommended review items. The review work will not be graded or turned in. The work is on topics and skills you have learned, so not new material. That means we will not spend significant class time on these foundational concepts, so it is assumed you have a pretty decent grasp of them. You are always

welcome to email me or set up a Google Meet session over the summer if you need help. We will begin the course on August 23rd assuming that you know this material. If you need help or have any questions, please email me at mcmullenj@chsvb.org. We can set up a Google Meet if necessary for questions.

Have a wonderful summer and I look forward to a great year with you in 2021-2022. Please reach out to me with any questions. I will email you when I have access to class rosters and open Google Classroom for the coming school year. God bless, Mrs. McMullen
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