

Chemistry

RCAS Policies/Procedures:

Students will be required to follow all RCAS policies and procedures. To view the RCAS High School Student Handbook, click [handbook](#).

Course Description:

Chemistry will consist of laboratory work, demonstrations, discussion and lecture with the following topics: metric measurement, conversions, atomic structure, nomenclatures and formulas, periodicity, bonding, stoichiometry, thermochemistry, solutions, equilibrium, plus acids and bases.

Textbook:

A Natural Approach to Chemistry Second Edition

Required Resources:

“Limited Choice” Resources: (students will be asked to choose at least one title from this list)

Student Choice:

Will student be asked to choose additional reading material from the classroom or school library?

No

Essential Questions:

- What is the most important subatomic particle?
- How does the structure of the atom establish its function?

- How are elements arranged on the periodic table?
- What information can be obtained from the periodic table?
- Why and how do atoms bond?
- How can we predict the products of a chemical reaction?
- How do reactions follow the law of conservation of mass?
- Why do we use the mole and what is its purpose?
- What are uses for percent composition?
- What the heck is stoichiometry?
- What is the purpose of stoichiometry?
- What is the purpose of the percent yield?
- How is energy involved in chemical reactions?
- How is energy involved in phase changes?
- Where does the energy in chemical reactions come from?
- How can changes in the nucleus of an atom be described?
- How are temperature, pressure, volume and amount of gas related?
- What are some ways we use gases in our daily lives?

Essential Learning Intentions:

- Student can interpret isotopic models and notation.
- Student can calculate the average atomic mass given element's isotopes.
- Student can classify the five types of chemical reactions.
- Student can write the electron configuration of a given element or ion.
- Student can interpret key characteristics of elements based on the location on the periodic table.
- Student can write the names and formulas of acids.
- Student can draw Lewis structures for covalent compounds using VSEPR Theory.
- Student can predict the products of synthesis, decomposition, double replacement and combustion reactions.
- Student can use the activity series to determine if a single replacement reaction will occur.
- Student can define Avogadro's number as it relates to a mole of a substance.
- Student can distinguish between the atomic mass of an element and its

molar mass.

- Student can convert the mass of a substance to the number of moles of a substance and moles to mass.
- Student can identify the volume of quantity of gas at STP.
- Student can use a solubility chart to establish if a precipitate will be formed.
- Student can calculate the percent mass of an element in a compound.
- Student can distinguish between empirical and molecular formulas.
- Student can determine the percent composition of a substance by mass or experimentally.
- Student can describe how $[H^+]$ and $[OH^-]$ are related in an aqueous solution.
- Students can classify a solution as neutral, acidic, or basic given the hydrogen-ion or hydroxide-ion concentration.
- Student can define the products of an acid-base reaction.
- Student can describe when a solution of salt is acidic or basic.
- Student can calculate the molar mass of a substance
- Student can convert the amount of a substance from mass to volume to particles using molar conversion.
- Student can use a balanced chemical equation to complete stoichiometric conversions.
- Student can identify the limiting reactant through calculations.
- Student can calculate the percent yield or percent error of an experiment.
- Student can explain what happens in the solution process.
- Student can describe why all ionic compounds are electrolytes.
- Student can identify how different factors determine the rate at which a substance dissolves.
- Student can calculate the molarity of a solution.
- Student can calculate how to dilute from a more concentrated solution.
- Students can define acids and bases in terms of Arrhenius, Bronsted-Lowry, and Lewis.
- Student can identify types of nuclear reactions, predict products, and balance nuclear equations.
- Student can determine the half-life of radioactive elements.
- Student can differentiate between alpha, beta, and gamma particles.
- Student can distinguish between heat and temperature.
- Student can predict the behavior of a gas as a particular level as variables are manipulated.
- Student can determine the effect on a gas if one or more of the variables have changed.
- Student can determine an unknown variable of an ideal gas given a set of conditions.