

# FUTURES HIGH SCHOOL CURRICULUM MAP FOR CHEMISTRY

*"If you don't know the destination, then any road will do."*

MONTH	CONTENT	KEY STANDARDS	ASSESSMENTS
August	<p><b><u>Atomic and Molecular Structure</u></b></p> <ul style="list-style-type: none"> <li>Relate the position of an element in the periodic table to its atomic number of electrons, protons, and neutrons.</li> <li>Use the periodic table to identify metals, semi-metals, and nonmetals.</li> <li>Use the periodic table to identify alkali metals, alkaline earth metals, transition metals and halogens.</li> </ul>	<p><b><u>California Content Standards: Chemistry 1a,b,c,d</u></b></p> <p>Students will demonstrate scientific progress and understanding that: The periodic table displays the elements in increasing order of atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure, by asking meaningful questions and performing scientific investigations</p>	<ul style="list-style-type: none"> <li>Tests/Quizzes</li> <li>Lab write-ups.</li> <li>Directed class assignments</li> <li>Home works</li> <li>Class participation</li> <li>State testing</li> </ul>
September	<ul style="list-style-type: none"> <li>Use the periodic table to identify trends in ionization energy.</li> <li>Use the periodic table to determine the number of electrons available for bonding</li> </ul> <p><b><u>Nuclear Processes</u></b></p> <ul style="list-style-type: none"> <li>Distinguish between alpha, beta, and gamma radiation and their properties.</li> <li>Calculate the amount of a radioactive substance remaining after and integral number and half-lives have passed.</li> <li>Calculate the energy released in a nuclear fusion or fission</li> </ul>	<p><b><u>California Content Standards: Chemistry 11b,d,f</u></b></p> <p>Students will demonstrate scientific progress and understanding of: Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion by asking meaningful questions and performing scientific investigations.</p>	<ul style="list-style-type: none"> <li>Tests/Quizzes</li> <li>Lab write-ups.</li> <li>Directed class assignments</li> <li>Home works</li> <li>Class participation</li> <li>State testing</li> </ul>
October	<p><b><u>Chemical Bonds</u></b></p> <ul style="list-style-type: none"> <li>Predict chemical bonds between atoms in molecule such as NH<sub>3</sub>, N<sub>2</sub>,</li> </ul>	<p><b><u>California Content Standards: Chemistry 2a,b,c,d,e,f</u></b></p> <p>Students will demonstrate scientific progress</p>	<ul style="list-style-type: none"> <li>Tests/Quizzes</li> <li>Lab write-ups.</li> <li>Directed class</li> </ul>

	<p>CH<sub>4</sub> that are covalent.</p> <ul style="list-style-type: none"> <li>• Draw Lewis dot structures.</li> <li>• Explain that Ionic compounds are held together by the electrostatic attractions of positive and negative charges of the ions.</li> <li>• Discuss how inter-molecular forces in liquids are weaker than that in solids and can move about relative to each other.</li> </ul>	<p>and understanding of: Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules by asking meaningful questions and performing scientific investigations.</p>	<p>assignments</p> <ul style="list-style-type: none"> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>
<b>November</b>	<p><b><u>Conservation of Matter and Stoichiometry</u></b></p> <ul style="list-style-type: none"> <li>• Describe chemical reactions by writing balanced equations.</li> <li>• Demonstrate the concept of a mole and be able to calculate the grams of one mole of any element.</li> <li>• Determine the molar mass of any molecule from its' chemical formula and a table of atomic masses</li> </ul>	<p><b><u>California Content Standards: Chemistry 3a,b,c,d,e</u></b> Students will demonstrate scientific progress and understanding of: The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants by asking meaningful questions and performing scientific investigations.</p>	<ul style="list-style-type: none"> <li>• Tests/Quizzes</li> <li>• Lab write-ups.</li> <li>• Directed class assignments</li> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>
<b>December</b>	<ul style="list-style-type: none"> <li>• Calculate the number of molecules from the number of moles, number of particles or volume of gas at standard temperature and pressure.</li> <li>• Calculate the masses of reactants or products from the mass of one reactant or product using a balanced equation and a table of atomic masses.</li> </ul>		<ul style="list-style-type: none"> <li>• Tests/Quizzes</li> <li>• Lab write-ups.</li> <li>• Directed class assignments</li> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>
<b>January</b>	<p><b><u>Gases and Their Properties</u></b></p> <ul style="list-style-type: none"> <li>• Explain the random motion of molecules and their collisions</li> </ul>	<p><b><u>California Content Standards: Chemistry 4a,b,c,d,e,f</u></b> Students will demonstrate scientific progress</p>	<ul style="list-style-type: none"> <li>• Tests/Quizzes</li> <li>• Lab write-ups.</li> <li>• Directed class</li> </ul>

	<p>create pressure on a surface.</p> <ul style="list-style-type: none"> <li>• Explain the diffusion of gases by the random motion of molecules.</li> <li>• Cite the value and meaning of standard temperature and pressure (STP).</li> <li>• Apply the gas laws to relations between the pressure, temperature and volume of any mixture of ideal gases.</li> <li>• Convert between the Celsius and Kelvin temperature scales.</li> <li>• Describe absolute zero in the Kelvin scale.</li> </ul>	<p>and understanding of:</p> <p>The kinetic molecular theory describes the motion of atoms and molecules and explains the properties of gases reactants by asking meaningful questions and performing scientific investigations.</p>	<p>assignments</p> <ul style="list-style-type: none"> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>
February	<p><b><u>Solutions</u></b></p> <ul style="list-style-type: none"> <li>• Define solute and solvent.</li> <li>• Explain dissolving as a process of random molecular motion.</li> <li>• Explain how temperature, pressure, and surface area affect the dissolving process.</li> <li>• Calculate concentration in moles per liter, grams per liter, parts per million, and percent composition.</li> </ul>	<p><b><u>California Content Standards: Chemistry 6a,b,c,d,e,f</u></b></p> <p>Students will demonstrate scientific progress and understanding that:</p> <p>Solutions are homogenous mixtures of two or more substances by asking meaningful questions and performing scientific investigations.</p>	<ul style="list-style-type: none"> <li>• Tests/Quizzes</li> <li>• Lab write-ups.</li> <li>• Directed class assignments</li> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>
March	<p><b><u>Chemical Thermodynamics</u></b></p> <ul style="list-style-type: none"> <li>• Describe temperature and heat flow in terms of the motion of the molecules (atoms).</li> <li>• Recognize endo- and exothermic reactions.</li> <li>• Calculations involving the latent heat of fusion, latent heat of condensation and specific heat.</li> </ul>	<p><b><u>California Content Standards: Chemistry 7a,b,c,d</u></b></p> <p>Students will demonstrate scientific progress and understanding that:</p> <p>Energy is exchanged or transferred in all chemical reactions and physical changes of matter by asking meaningful questions and performing scientific investigations.</p>	<ul style="list-style-type: none"> <li>• Tests/Quizzes</li> <li>• Lab write-ups.</li> <li>• Directed class assignments</li> <li>• Home works</li> <li>• Class participation</li> <li>• State testing</li> </ul>

	<p style="text-align: center;"><b><u>Reaction Rates</u></b></p> <ul style="list-style-type: none"> <li>Describe the relationship between the changing concentrations of the reactants and products to the change in reaction rate.</li> <li>Describe the factors that how concentration, pressure and temperature affect reaction rates.</li> <li>Explain the role of a catalyst in changing a reaction rate.</li> </ul>	<p style="text-align: center;"><b><u>California Content Standards: Chemistry</u></b> <b><u>8a,b,c,d</u></b></p> <p>Students will demonstrate scientific progress and understanding that: Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules by asking meaningful questions and performing scientific investigations.</p>	
April	<p style="text-align: center;"><b><u>Chemical Equilibrium</u></b></p> <ul style="list-style-type: none"> <li>Use LeChatelier's principle to predict the effect of changes in concentration, temperature, and pressure.</li> <li>Define when equilibrium is established</li> </ul> <p style="text-align: center;"><b><u>Acids and Bases</u></b></p> <ul style="list-style-type: none"> <li>Describe observable properties of acids, bases, and salt solution.</li> <li>Recognize that acids are hydrogen ion donating and bases are hydrogen ion accepting substances.</li> <li>Strong acids and bases fully dissociate and weak acids and bases partially dissociate.</li> <li>Use the pH scale to characterize acid and base solutions.</li> </ul>	<p style="text-align: center;"><b><u>California Content Standards: Chemistry</u></b> <b><u>9a,b,c</u></b></p> <p>Students will demonstrate scientific progress and understanding that: Chemical equilibrium is a dynamic process at the molecular level by asking meaningful questions and performing scientific investigations.</p> <p style="text-align: center;"><b><u>California Content Standards: Chemistry</u></b> <b><u>5a,b,c,d</u></b></p> <p>Students will demonstrate scientific progress and understanding that: Acids, bases, and salts are three classes of compounds that form ions in water solutions by asking meaningful questions and performing scientific investigations.</p>	<ul style="list-style-type: none"> <li>Tests/Quizzes</li> <li>Lab write-ups.</li> <li>Directed class assignments</li> <li>Home works</li> <li>Class participation</li> <li>State testing</li> </ul>
May	<p style="text-align: center;"><b><u>Organic and Biochemistry</u></b></p> <ul style="list-style-type: none"> <li>Explain that the bonding characteristics in carbon lead to a</li> </ul>	<p style="text-align: center;"><b><u>California Content Standards: Chemistry</u></b> <b><u>10a,b,c</u></b></p> <p>Students will demonstrate scientific progress</p>	

	<p>large variety of molecules ranging from carbohydrates to large biological molecules.</p> <ul style="list-style-type: none"><li>• Explain that larger molecules like protein, nucleic acids and starch are formed by repeating combinations of smaller structures.</li></ul>	<p>and understanding that: The bonding characteristics of carbon allow the formation of many different organic molecules of varied sizes, shapes, and chemical properties and provide the biochemical basis of life by asking meaningful questions and performing scientific investigations</p>	
<b>June</b>			