

# MONTGOMERY COUNTY PUBLIC SCHOOLS

## Chemistry Curriculum Pacing Guide

1 <sup>st</sup> 9 Weeks	SOL Objectives	Vocabulary
<p data-bbox="107 298 260 407"><b>90 Minute Class:</b> 8 Days</p> <p data-bbox="107 561 260 670"><b>45 Minute Class:</b> 15 Days</p>	<p data-bbox="321 261 1654 370"><b>CH.1 The student will investigate and understand that experiments in which variables are measured, analyzed, and evaluated produce observations and verifiable data. Key concepts include:</b></p> <ul data-bbox="369 375 1682 781" style="list-style-type: none"><li>a) mathematical manipulations including SI units, scientific notation, linear equations, graphing, ratio and proportion, significant digits, and dimensional analysis;</li><li>b) use of appropriate technology including computers, graphing calculators, and probeware, for gathering data, communicating results, and using simulations to model concepts;</li><li>c) manipulation of multiple variables, using repeated trials;</li><li>d) proper response to emergency situations;</li><li>e) the use of current applications to reinforce chemistry concepts;</li><li>f) mathematical and procedural error analysis;</li><li>g) accurate recording, organization, and analysis of data through repeated trials;</li><li>h) safe use of chemicals and equipment;</li><li>i) construction and defense of a scientific viewpoint; and</li></ul> <p data-bbox="321 821 1654 930"><b>CH.2 The student will investigate and understand that the placement of elements on the periodic table is a function of their atomic structure. The periodic table is a tool used for the investigations of:</b></p> <ul data-bbox="369 935 932 967" style="list-style-type: none"><li>h) chemical and physical properties; and</li></ul> <p data-bbox="321 1008 1654 1117"><b>CH.1 The student will investigate and understand that experiments in which variables are measured, analyzed, and evaluated produce observations and verifiable data. Key concepts include:</b></p> <ul data-bbox="369 1122 884 1154" style="list-style-type: none"><li>a) designated laboratory techniques;</li></ul>	<p data-bbox="1717 261 1990 756">filtering, chromatography, material data safety sheet, erlenmeyer flask, crucible, clay triangle, evaporating dish, pipette, buret, volumetric flask, barometer, fume hood, significant digit, accuracy, precision, mean, percent error, SI measurement, milli-, centi-, kilo-, independent variable, dependent variable</p>

<p><b>90 Minute Class:</b> 5 Days</p> <p><b>45 Minute Class:</b> 10 Days</p>	<p><b>CH.2 The student will investigate and understand that the placement of elements on the periodic table is a function of their atomic structure. The periodic table is a tool used for the investigations of:</b></p> <ul style="list-style-type: none"> <li>a) average atomic mass, mass number, and atomic number;</li> <li>b) isotopes, half-lives, and radioactive decay;</li> <li>c) mass and charge characteristics of subatomic particles;</li> <li>i) historical and quantum models</li> </ul>	<p>mixture element compound alkali metal alkaline earth metal halogen noble gas transition metal principle energy level Hund's rule Aufbau Principle Pauli Exclusion Principle oxidation number</p>
<p><b>90 Minute Class:</b> 4 Days</p> <p><b>45 Minute Class:</b> 8 Days</p>	<p><b>CH.2 The student will investigate and understand that the placement of elements on the periodic table is a function of their atomic structure. The periodic table is a tool used for the investigations of:</b></p> <ul style="list-style-type: none"> <li>d) families or groups;</li> <li>e) periods;</li> <li>f) trends including atomic radii, electronegativity, shielding effect, and ionization energy;</li> <li>g) electron configurations, valence electrons, and oxidation numbers;</li> </ul>	
<p><b>90 Minute Class:</b> 8 Days</p> <p><b>45 Minute Class:</b> 17 Days</p>	<p><b>CH.3 The student will investigate and understand how conservation of energy and matter is expressed in chemical formulas and balanced equations. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>a) nomenclature;</li> <li>c) writing chemical formulas;</li> <li>d) bonding types;</li> </ul>	<p>cation, anion, subscript, law of multiple proportions, Lewis dot diagram, valence electron, oxidation number, octet rule, ionic bond, covalent bond, binary compound, formula unit, molecule, molecular formula, structural formula, polyatomic ion, nomenclature, VSEPR model, polar bond, nonpolar bond, polar molecule, nonpolar molecule, ionization energy, electronegativity.</p>

2 <sup>nd</sup> 9 Weeks	SOL Objectives	Vocabulary
<p><b>90 Minute Class:</b> 5 Days</p> <p><b>45 Minute Class:</b> 9 Days</p>	<p><b>CH.3 The student will investigate and understand how conservation of energy and matter is expressed in chemical formulas and balanced equations. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>b) balancing chemical equations;</li> <li>e) reaction types</li> </ul>	<p>cation, anion, subscript, law of multiple proportions, Lewis dot diagram, valence electron, oxidation number, octet rule, ionic bond, covalent bond, binary compound, formula unit, molecule, molecular formula, structural formula, polyatomic ion, nomenclature, VSEPR model, polar bond, nonpolar bond, polar molecule, nonpolar molecule, ionization energy, electronegativity.</p>
<p><b>90 Minute Class:</b> 10 Days</p> <p><b>45 Minute Class:</b> 20 Days</p>	<p><b>CH.4 The student will investigate and understand that chemical quantities are based on molar relationships. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>a) Avogadro's principle and molar volume;</li> <li>b) stoichiometric relationships</li> </ul>	<p>mole Avagadro's number molar mass empirical formula molecular formula percentage composition molar volume stoichiometry dimensional analysis formula unit molecule limiting reactant actual yield theoretical yield percent yield factor - label method</p>

3 <sup>rd</sup> 9 Weeks	SOL Objectives	Vocabulary
<p><b>90 Minute Class:</b> 7 Days</p> <p><b>45 Minute Class:</b> 13 Days</p>	<p><b>CH.5 The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>e) molar heats of fusion and vaporization;</li> <li>f) specific heat capacity; and</li> </ul>	<p>kinetic molecular theory, kilopascal, atmosphere (atm), mm Hg, Ideal Gas Law, Charles Law, Combined Gas Law, Dalton's Law of Partial Press, intermolecular force, vapor pressure, heating curve, molar heat of fusion, molar heat of vaporization, specific heat capacity, plasma, colligative property, Gay Lussac's Gas Law</p>
<p><b>90 Minute Class:</b> 3 Days</p> <p><b>45 Minute Class:</b> 7 Days</p>	<p><b>CH.5 The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>c) vapor pressure;</li> <li>d) phase changes;</li> </ul>	
<p><b>90 Minute Class:</b> 6 Days</p> <p><b>45 Minute Class:</b> 12 Days</p>	<p><b>CH.5 The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>b) partial pressure and gas laws;</li> <li>a) pressure, temperature, and volume;</li> </ul>	
<p><b>90 Minute Class:</b> 4 Days</p> <p><b>45 Minute Class:</b> 8 Days</p>	<p><b>CH.4 The student will investigate and understand that chemical quantities are based on molar relationships. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>c) solution concentrations;</li> </ul> <p><b>CH.5 The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles. Key concepts include:</b></p> <ul style="list-style-type: none"> <li>g) colligative properties.</li> </ul>	

4 <sup>th</sup> 9 Weeks	SOL Objectives	Vocabulary
<p><b>90 Minute Class:</b> 5.5 Days</p> <p><b>45 Minute Class:</b> 11 Days</p>	<p><b>CH.4 The student will investigate and understand that chemical quantities are based on on molar relationships. Key concepts include:</b></p> <p>d) acid/base theory; strong electrolytes, weak electrolytes, and nonelectrolytes; dissociation and ionization; pH and pOH; and the titration process.</p>	<p>molarity, solution, dilution, solubility/solubility curve, saturated/unsaturated, supersaturated, Arrhenius theory, Bronsted-Lowry theory, acid/base, electrolytes, pH/pOH, titration, indicator, dissociation, ionization.</p>
<p><b>90 Minute Class:</b> 3.5 Days</p> <p><b>45 Minute Class:</b> 7 Days</p>	<p><b>CH.3 The student will investigate and understand how conservation of energy and matter is expressed in chemical formulas and balanced equations. Key concepts include:</b></p> <p>f) reaction rates, kinetics, and equilibrium.</p>	<p>entropy exothermic endothermic activation energy diagram equilibrium Le Chatelier's Principle</p>
<p><b>90 Minute Class:</b> 3 Days</p> <p><b>45 Minute Class:</b> 6 Days</p>	<p><b>CH.6 The student will investigate and understand how basic chemical properties relate to organic chemistry and biochemistry. Key concepts include:</b></p> <p>a) unique properties of carbon that allow multi-carbon compounds; and b) uses in pharmaceuticals and genetics, petrochemicals, plastics, and food.</p>	<p>organic, hydrocarbon, functional group, polymer, nylon, saturation</p>
<p><b>90 Minute Class:</b> 15 Days</p> <p><b>45 Minute Class:</b> 21 Days</p>	<p><b>SOL Review</b></p> <p><b>Extended Topics</b></p>	