

# SHORELINE PUBLIC SCHOOLS

## COURSE SYLLABUS

**Building:** Shorewood

**Year:** 2016-17

**Name of Course:** Chemistry (Year long)

**Instructors:** Horne, Fawcett

**Course Description:** Chemistry is the study of atoms and molecules; their nature, behavior, interactions, and transformations. It is based on the foundations of the atomic theory, kinetic theory, and the quantitative relationships of chemicals undergoing reactions. This course requires students to apply both math and science skills, with an emphasis on problem solving and laboratory experience.

*Note: This is a working document and course content may change to reflect the Next Generation Science Standards.*

### Classroom Expectations:

1. Class participation – bring notebook & iPad daily and be prepared for lab investigations
2. Active participation – includes being present and on time to class
3. Homework readings and questions.
4. Quality projects and formal lab reports.
5. Regular quizzes, unit exams, and semester finals

Concepts/Themes	Power Standards	Time
<b>Math Skills</b> I can apply math skills to problems in chemistry.	<ul style="list-style-type: none"> <li>I can use the appropriate tools of mathematics such as algebraic equations, dimensional analysis, significant figures, scientific notation, and graphing.</li> </ul>	1 – 2 weeks
<b>Atomic Structure</b> I can describe the structure of an atom.	<ul style="list-style-type: none"> <li>I can determine the number of protons, neutrons, and electrons in an atom.</li> <li>I can use isotopes to calculate the atomic mass of an element.</li> <li>I can describe the arrangement of electrons in an atom.</li> </ul>	2 – 3 weeks
<b>Periodic Table</b> I can explain how the periodic table is organized.	<ul style="list-style-type: none"> <li>I can identify metals and nonmetals on the periodic table.</li> <li>I can explain why elements within the same groups on the periodic table have similar properties.</li> <li>I can relate the arrangement of the periodic table to atomic structure.</li> <li>I can determine the number of valence electrons of an element using the periodic table.</li> </ul>	2 – 3 weeks
<b>Ionic &amp; Covalent Bonds</b> I can distinguish between ionic and covalent bonding.	<ul style="list-style-type: none"> <li>I can identify an element as a metal or nonmetal.</li> <li>I can predict whether an element will gain, lose, or share electrons.</li> <li>I can describe how atoms form ionic bonds.</li> <li>I can describe how atoms form covalent bonds.</li> <li>I can predict the shape of a molecule.</li> <li>I can determine whether a molecule is polar or nonpolar.</li> </ul>	2 – 3 weeks
<b>Chemical Reactions</b> I can use equations to describe chemical reactions.	<ul style="list-style-type: none"> <li>I can explain the Law of Conservation of Mass.</li> <li>I can balance a chemical equation.</li> <li>I can identify 5 types of chemical reactions.</li> <li>I can predict the products of a chemical reaction.</li> </ul>	3 – 4 weeks
<b>Stoichiometry</b> I can relate mathematical quantities to chemical reactions.	<ul style="list-style-type: none"> <li>I can use dimensional analysis to convert between grams, Liters, moles, and molecules/atoms.</li> <li>I can use mole ratios to determine the amount of product formed in a reaction.</li> <li>I can identify the limiting reactant of a chemical equation.</li> <li>I can calculate percent yield for a chemical reaction.</li> </ul>	3 weeks
<b>States of Matter</b> I can use the kinetic theory to describe states of matter and behavior of gases.	<ul style="list-style-type: none"> <li>I can use molecular structure and intermolecular forces to predict relative rates of evaporation for polar and nonpolar substances.</li> <li>I can use gas laws to calculate the pressure, volume, temperature, or number of moles of a gas.</li> <li>I can use the ideal gas law to experimentally determine the molar mass of a substance.</li> </ul>	4 weeks

<b>Solutions</b> I can describe properties of a solution.	<ul style="list-style-type: none"> <li>• I can experimentally determine the solubility of a substance</li> <li>• I can calculate concentration in terms of molarity and molality.</li> <li>• I can create a dilute solution from a stock solution.</li> <li>• I can determine the boiling point and the freezing point of a solution.</li> <li>• I can experimentally determine the molar mass of a solute using freezing point depression.</li> </ul>	3 weeks
<b>Thermochemistry</b> I can determine how heat energy is transferred during chemical and physical changes.	<ul style="list-style-type: none"> <li>• I can use the heating curve for water to determine the energy released or absorbed during changes of state.</li> <li>• I can use a calorimeter to determine the energy released or absorbed when a substance dissolves.</li> <li>• I can calculate the amount of heat released or absorbed during a chemical reaction.</li> </ul>	1 week
<b>Kinetics/Equilibrium</b> I can determine factors that affect rates of reaction and equilibrium.	<ul style="list-style-type: none"> <li>• I can explain how a catalyst, temperature, concentration, surface area, and pressure (gases) affect the rate of reaction.</li> <li>• I can explain how temperature, concentration, and pressure affect a reaction at equilibrium.</li> </ul>	1 week
<b>Acids &amp; Bases</b> I can describe the properties of acids, bases, and salts.	<ul style="list-style-type: none"> <li>• I can describe differences between acids and bases.</li> <li>• I can recognize a neutralization reaction.</li> <li>• I can distinguish weak acids/bases from strong using a titration curve.</li> <li>• I can calculate the pH of a solution.</li> <li>• I can experimentally determine the molarity of an acid or base using a titration.</li> </ul>	3 weeks
<b>Electrochemistry</b> I can describe the process of oxidation and reduction.	<ul style="list-style-type: none"> <li>• I can assign oxidation numbers to elements in compounds, molecules, and ions.</li> <li>• I can recognize a redox reaction.</li> <li>• I can identify the oxidizing agent and reducing agent in a chemical reaction.</li> </ul>	2 weeks
<b>Nuclear Chemistry</b> I can describe nuclear reactions.	<ul style="list-style-type: none"> <li>• I can identify the relative strengths of alpha, beta, and gamma radiation.</li> <li>• I can balance a nuclear equation.</li> <li>• I can use half-life data to calculate the age of a substance by radioactive decay.</li> </ul>	1 week
<b>Organic Chemistry</b> I can identify organic molecules.	<ul style="list-style-type: none"> <li>• I can identify the products for combustion of a hydrocarbon.</li> <li>• I can recognize structural isomers.</li> <li>• I can recognize organic acids and alcohols from their structural formulas.</li> </ul>	1 week
<b>Assessments:</b> Unit tests, weekly quizzes, notebook, lab work and/or lab reports, lab practical (exam), final exam (American Chemical Society)		
<b>Grading:</b> Course notebook (daily notes, activities, homework) 20% Labs (complete investigations and participation) 20% Weekly quizzes 10% Unit tests 40% Final exam 10%		
<b>Curriculum/Textbooks:</b> Chemistry (Pearson)		
<b>Additional Resources/Technology:</b> Laptops, Vernier Probeware, iPads, ExploreLearning.com		