

Essential Understandings	<ul style="list-style-type: none"> ▪ Causation: Nothing “just happens”. Everything is caused. ▪ Interrelatedness: Everything in the universe is connected to everything else in the universe. ▪ Dynamism: Everything is changing in some way all the time. ▪ Entropy: Change has direction. Generally, simple precedes complex. Generally, order changes toward disorder. ▪ Uniformitarianism: The way the universe works today is the way it worked yesterday and the way it will work tomorrow.
Essential Questions	<ul style="list-style-type: none"> ▪ How do atoms combine? ▪ Under what circumstances do atoms combine? ▪ How is the Law of Conservation of Mass demonstrated when atoms combine? ▪ What determines the polarity of molecules? ▪ How are molecules different from ionic compounds? ▪ What are chemical reactions? ▪ What are the basic chemical reactions? ▪ How can balanced chemical equations be used to predict the outcomes of reactions? ▪ What is Avogadro’s Law? ▪ What is molarity? ▪ What is stoichiometry?
Essential Knowledge	<ul style="list-style-type: none"> ▪ Covalent bonds are formed by sharing electrons. ▪ Ionic bonds are formed by transferring electrons. ▪ Compounds are formed with outer shell electrons. ▪ Atoms combine in whole number ratios. ▪ Molecular symmetry determines polarity. ▪ Balanced chemical equations are important chemical tools. ▪ Stoichiometry is using balanced equations to determine quantitative results. ▪ There are six basic chemical reactions.
Vocabulary	<ul style="list-style-type: none"> ▪ <u>Terms:</u> <ul style="list-style-type: none"> ○ Chemical bonding ○ Ionic bond ○ Covalent bond ○ Ion ○ Polar and nonpolar molecule ○ Oxidation number / state ○ Molecules ○ Compound ○ Avogadro’s Law ○ Molarity ○ Stoichiometry
Essential	<ul style="list-style-type: none"> ▪ Writing chemical formulae with correct subscripts ▪ Predicting how atoms will combine using the periodic table

Skills	<ul style="list-style-type: none">▪ Demonstrating the law of conservation of matter by writing chemical formulae and balancing chemical equations▪ Using balanced equations to solve word problems, predicting the quantitative outcome of reactions.▪ Describing how molecules and ionic compounds differ
Related Maine Learning Results	<p>A2 Models</p> <p>Students evaluate the effectiveness of a model by comparing its predictions to actual observations from the physical setting, the living environment, and the technological world.</p> <p>B1 Skills and Traits of Scientific Inquiry</p> <p>Students methodically plan, conduct, analyze data from, and communicate results of in-depth scientific investigations, including experiments guided by a testable hypothesis.</p> <ul style="list-style-type: none">a. Identify questions, concepts, and testable hypotheses that guide scientific investigations.b. Design and safely conduct methodical scientific investigations, including experiments with controls.c. Use statistics to summarize, describe, analyze, and interpret results.d. Formulate and revise scientific investigations and models using logic and evidence.f. Recognize and analyze alternative explanations and models using scientific criteria.g. Communicate and defend scientific ideas. <p>D3 Matter and Energy</p> <p>Students describe the structure, behavior, and interactions of matter at the atomic level and the relationship between matter and energy.</p> <ul style="list-style-type: none">a. Describe the structure of atoms in terms of neutrons, protons, and electrons and the role of the atomic structure in determining chemical properties.b. Describe how the number and arrangement of atoms in a molecule determine a molecule's properties, including the types of bonds it makes with other molecules and its mass, and apply this to predictions about chemical reactions.d. Describe how light is emitted and absorbed by atoms' changing energy levels, and how the results can be used to identify a substance.

	<p>e. Describe factors that affect the rate of chemical reactions (including concentration, pressure, temperature, and the presence of molecules that encourage interaction with other molecules).</p> <p>f. Apply and understanding of the factors that affect the rate of chemical reaction to predictions about the rate of chemical reactions.</p> <p>g. Describe nuclear reactions, including fusion and fission, and the energy they release.</p> <p>h. Describe radioactive decay and half-life.</p> <p>i. Explain the relationship between kinetic and potential energy and apply knowledge to solve problems.</p> <p>j. Describe how in energy transformations the total amount of energy remains the same, but because of inefficiencies (heat, sound and vibration) useful energy is often lost through radiation or conduction.</p> <p>k. Apply an understanding of energy transformations to solve problems.</p> <p>l. Describe the relationship among heat, temperature, and pressure in terms of the actions of atoms, molecules and ions.</p>
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Sample Lessons And Activities	<ul style="list-style-type: none"> ▪ Lecture ▪ Chemical reactions demonstration ▪ Solubility laboratory exercise ▪ Writing chemical formulae ▪ Balancing chemical equations ▪ Copper extraction laboratory ▪ Solving chemical equation word problems
Sample Classroom Assessment Methods	<ul style="list-style-type: none"> ▪ Quizzes ▪ Chapter tests ▪ Laboratory experiments and reports ▪ Formative classroom assessments ▪ Research a career in the field of chemistry, showing how a basic knowledge of chemistry is used, and write a paper.
Sample Resources	<ul style="list-style-type: none"> ▪ <u>Publications:</u> <ul style="list-style-type: none"> ○ Glencoe <u>Physical Science</u> ○ MARVEL Data bases* ○ GALE Resource Data bases** ▪ <u>Videos:</u> <ul style="list-style-type: none"> ○ Connections Series ○ The World of Chemistry
Technology Link	<ul style="list-style-type: none"> ▪ http://www.brunswick.k12.me.us/curriculum ▪ * Data base may also be accessed from home http://www.maine.gov/marvel ▪ ** Data base may also be accessed from home with logon and

	password http://infotrac.galegroup.com/itweb
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