

Textbook Alignment to the Utah Core – Chemistry

This alignment has been completed using an “Independent Alignment Vendor” from the USOE approved list (www.schools.utah.gov/curr/imc/indvendor.html.) Yes No

Name of Company and Individual Conducting Alignment: Inside Edge Publishing

A “Credential Sheet” has been completed on the above company/evaluator and is (Please check one of the following):

On record with the USOE.

The “Credential Sheet” is attached to this alignment.

Instructional Materials Evaluation Criteria (name and grade of the core document used to align): **Chemistry Core Curriculum**

Title: **Prentice Hall Chemistry (Wilbraham) © 2008**

ISBN#: **0-13-251210-6 (SE), 0-13-251211-4 (TE)**

Publisher: **Pearson Publishing as Prentice Hall**

KEY:

SE = Student Edition - TE = Teacher Edition - TR = Teaching Resources - TECH = Technology

GRSW = Guided Reading and Study Workbook - CTR = Core Teaching Resources - T = Transparencies

IT = Interactive Textbook - GO = Go Online

Overall percentage of coverage in the *Student Edition (SE)* and *Teacher Edition (TE)* of the Utah State Core Curriculum: _____ 100%

Overall percentage of coverage in *ancillary materials* of the Utah Core Curriculum: _____ 96%

STANDARD I: Students will understand that all matter in the universe has a common origin and is made of atoms, which have structure and can be systematically arranged on the periodic table.

Percentage of coverage in the <i>student and teacher edition</i> for Standard I: _____ 100 %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard I: _____ 86%		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition(SE) and Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ⁹
Objective 1.1: Recognize the origin and distribution of elements in the universe.				
a.	Identify evidence supporting the assumption that matter in the universe has a common origin.	SE/TE: Can be developed from 39-43	TR: GRSW 2.1; CTR 2.1 Review TECH: T10-T11; IT Animation 1, Assessment 2.1; GO 2.1	
b.	Recognize that all matter in the universe and on earth is composed of the same elements.	SE/TE: Can be developed from 48-52	TR: GRSW 2.3; CTR 2.3 Review, Interpreting Graphics TECH: T12-T14; IT Problem-Solving 2.19, Assessment 2.3; GO 2.3	
c.	Identify the distribution of elements in the universe.	SE/TE: R4-R45		
d.	Compare the occurrence of heavier elements on earth and the universe.	SE/TE: Can be developed from R4-R45		
Objective 1.2: Relate the structure, behavior, and scale of an atom to the particles that compose it.				
a.	Summarize the major experimental evidence that led to the development of various atomic models, both historical and current.	SE/TE: 101-108, 127-132, 138-145	TR: GRSW 5.1 TECH: T57	

b.	Evaluate the limitations of using models to describe atoms.	SE/TE: Can be developed from 101-108, 127-132, 138-145	TR: GRSW 5.1; CTR 5.1 Review TECH: T57; IT Animation 5, Assessment 5.1	
c.	Discriminate between the relative size, charge, and	SE/TE: 104-108	TR: GRSW 4.2; CTR 4.2 Review TECH: T45-T47; IT Animation 4, Assessment 4.2; GO 4.2; Virtual Chemistry Labs 4-6	
	position of protons, neutrons, and electrons in the atom.			
d.	Generalize the relationship of proton number to the element's identity.	SE/TE: 110-119	TR: GRSW 4.3, CTR 4.3 Review TECH: T48-T56; IT Problem-Solving 4.15, 4.17, 4.20, 4.21, 4.24, Assessment 4.3; GO 4.3	
e.	Relate the mass and number of atoms to the gram-sized quantities of matter in a mole.	SE/TE: 287-296, 297-303	TR: GRSW 10.1, 10.2; CTR 10.1 Review, 10.2 Review TECH: T104-T107, T108-T109; IT Animation 11, Simulation 10, Problem-Solving 10.1, 10.4, 10.5, 10.7, 10.16, 10.18, 10.20, 10.22, Assessments 10.1, 10.2; Virtual Chemistry Lab 3	
Objective 1.3: Correlate atomic structure and the physical and chemical properties of an element to the position of the element on the periodic table.				
a.	Use the periodic table to correlate the number of protons, neutrons, and electrons in an atom.	SE/TE: 161-169	TR: GRSW 6.2; CTR 6.2 Review TECH: T67-T69; IT Assessment 6.2; GO 6.2	

b.	Compare the number of protons and neutrons in isotopes of the same element.	SE/TE: 110-119	TR: GRSW 4.3, CTR 4.3 Review TECH: T48-T56; IT Problem-Solving 4.15, 4.17, 4.20, 4.21, 4.24, Assessment 4.3; GO 4.3	
c.	Identify similarities in chemical behavior of elements within a group.	SE/TE: 170-178	TR: GRSW 6.3; CTR 6.3 Review TECH: T70-T74; IT Animation 7, Assessment 6.3; GO 6.3	
d.	Generalize trends in reactivity of elements within a group to trends in other groups.	SE/TE: 170-178	TR: GRSW 6.3; CTR 6.3 Review TECH: T70-T74; IT Animation 7, Assessment 6.3; GO 6.3	
e.	Compare the properties of elements (e.g., metal, nonmetallic, metalloid) based on their position in the periodic table.	SE/TE: 155-160, 161-167, 170-178, 253-258	TR: GRSW 6.1, 6.2, 6.3, 9.1; CTR 6.1 Review, Interpreting Graphics, 6.2 Review, 6.3 Review, 9.1 Review, Interpreting Graphics TECH: T65-T66, T67-T69, T70-T74, T94-T95; IT Animation 7, Problem-Solving 9.1, Assessments 6.1, 6.2, 6.3, 9.1; GO 6.1, 6.2, 6.3, 9.1	

STANDARD II: Students will understand the relationship between energy changes in the atom specific to the movement of electrons between energy levels in an atom resulting in the emission of absorption of quantum energy. They will also understand that the emission of high-energy particles results from nuclear changes and that matter can be converted to energy during nuclear reactions.

<p>Percentage of coverage in the <i>student and teacher edition</i> for Standard II: 100 %</p>	<p>Percentage of coverage not in student or teacher edition, but covered in</p>
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	<p>the <i>ancillary material</i> for Standard II: 100%</p>
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OBJECTIVES & INDICATORS	Coverage in <i>Student Edition (SE)</i> and <i>Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ⁹	
<p>Objective 2.1: Evaluate quantum energy changes in the atom in terms of the energy contained in light emissions.</p>				
<p>a.</p>	<p>Identify the relationship between wavelength and light energy.</p>	<p>SE/TE: 138-146</p>	<p>TR: GRSW 5.3; CTR 5.3 Review, Interpreting Graphics TECH: T61-T64; IT Animation 6, Simulations 3, 4, Problem-Solving 5.15, Assessment 5.3; GO 5.3; Virtual Chemistry Labs 1, 7-10</p>	
<p>b.</p>	<p>Examine evidence from the lab indicating that energy is absorbed or released in discrete units when electrons move from one energy level to another.</p>	<p>SE/TE: 138-146</p>	<p>TR: GRSW 5.3; CTR 5.3 Review, Interpreting Graphics TECH: T61-T64; IT Animation 6, Simulations 3, 4, Problem-Solving 5.15, Assessment 5.3; GO 5.3; Virtual Chemistry Labs 1, 7-10</p>	
<p>c.</p>	<p>Correlate the energy in a photon to the color of light emitted.</p>	<p>SE/TE: 138-146</p>	<p>TR: GRSW 5.3; CTR 5.3 Review, Interpreting Graphics TECH: T61-T64; IT Animation 6, Simulations 3, 4, Problem-Solving 5.15, Assessment 5.3; GO 5.3; Virtual Chemistry Labs 1, 7-10</p>	
<p>d.</p>	<p>After observing spectral emissions in the lab (e.g., flame test, spectrum tubes), identify unknown elements by comparison to known emission spectra.</p>	<p>SE/TE: 138-146</p>	<p>TR: GRSW 5.3; CTR 5.3 Review, Interpreting Graphics TECH: T61-T64; IT Animation 6, Simulations 3, 4, Problem-Solving 5.15, Assessment 5.3; GO 5.3; Virtual Chemistry Labs 1, 7-</p>	

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Objective 2.2: Evaluate how changes in the nucleus of an atom result in emission of radioactivity.				
a.	Recognize that radioactivity particles and wavelike radiations are products of the decay of an unstable nucleus.	SE/TE: 799-802, 803-808	TR: GRSW 25.1; CTR 25.1 Review TECH: T286-T288; IT Assessment 25.1	
b.	Interpret graphical data relating half-life and age of a radioactive substance.	SE/TE: 803-809, 814-815	TR: GRSW 25.2; CTR 25.2 Review, Interpreting Graphics TECH: T289-T292; IT Simulation 30, Problem-Solving 25.7, Assessment 25.2; GO 25.2	
c.	Compare the mass, energy, and penetrating power of alpha,	SE/TE: 799-802	TR: GRSW 25.1; CTR 25.1 Review TECH: T286-T288; IT Assessment 25.1	

	beta, and gamma radiation.			
d.	Compare the strong nuclear force to the amount of energy released in a nuclear reaction and contrast it to the amount of energy released in a chemical reaction.	SE/TE: Can be developed from 803-809, 810-815	TR: GRSW 25.2, 25.3; CTR 25.2 Review, Interpreting Graphics, 25.3 Review TECH: T289-T292, T293; IT Simulation 30, Problem-Solving 25.7, Assessments 25.2, 25.3, Animation 30; GO 25.2	
e.	After researching, evaluate and report the effects of nuclear radiation on humans or other organisms.	SE/TE: 816-819	TR: GRSW 25.4; CTR 25.4 Review TECH: T294; IT Assessment 25.4; GO 25.4	

STANDARD III: Students will understand chemical bonding and the relationship of the type of bonding to the chemical and physical properties of substances.

Percentage of coverage in the <i>student and teacher edition</i> for Standard III: _____ 100 %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard III: _____ 100%		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition(SE) and Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries⁹</i>
Objective 3.1: Analyze the relationship between the valence (outermost) electrons of an atom and the type of bond formed between atoms.				
a.	Determine the number of valence electrons in atoms using the periodic table.	SE/TE: 187-193, 194-199, 217-229	TR: GRSW 7.1, 7.2, 8.2; CTR 7.1 Review, 7.2 Review, Interpreting Graphics, 8.2 Review TECH: T75-T78, T79-T8, T87-T89; IT Problem-Solving 7.1, 7.12, 8.8, 8.10, Animation 8, Simulations 5, 6, Assessments 7.1, 7.2, 8.2; GO 7.1, 7.2, 8.2; Virtual Chemistry Lab 2	
b.	Predict that charge an atom will acquire when it forms an ion by gaining or losing electrons.	SE/TE: 187-193	TR: GRSW 7.1; CTR 7.1 Review TECH: T75-T78; IT Problem-Solving 7.1, Assessments 7.1; GO 7.1	
c.	Predict bond types based on the behavior of valence (outermost) electrons.	SE/TE: 194-200, 213-216	TR: GRSW 7.2, 8.1; CTR 7.2 Review, Interpreting Graphics, 8.1 Review TECH: T79-T81, T85-T86; IT Animation 8, Simulation 5, Problem-Solving 7.12, Assessments 7.2, 8.1; GO 7.2, 8.1; Virtual Chemistry Lab 2	

d.	Compare covalent, ionic, and metallic bonds with respect to	SE/TE: 194-200, 201-205, 213-216	TR: GRSW 7.2, 7.3, 8.1; CTR 7.2 Review, 7.3 Review, Interpreting Graphics, 8.1 Review TECH: T79-T81, T82-T84, T85-T86; IT Animations 8, 9, Simulation 5, Problem-Solving 7.12, Assessments 7.2, 7.3, 8.1; GO 7.2, 8.1; Virtual Chemistry Lab 2	

	electron behavior and relative bond strengths.			
Objective 3.2:	Explain that the properties of a compound may be different from those of the elements or compounds from which it is formed.			
a.	Use a chemical formula to represent the names of elements and numbers of atoms in a compound and recognize that the formula is unique to the specific compound.	SE/TE: 194-199, 213-229, 260-267, 268-279	TR: GRSW 7.2, 9.2; CTR 7.2 Review, Interpreting Graphics, 9.2 Review TECH: T79-T81, T96-T97; IT Animation 8, Simulations 5, 9, Problem-Solving 7.12, 9.11, 9.12, Assessments 7.2, 9.2; GO 7.2, 9.2; Virtual Chemistry Lab 2	
b.	Compare the physical properties of a compound to the elements that form it.	SE/TE: Can be developed from 39-43, 194-199, 213-216	TR: GRSW 2.1; CTR 2.1 Review TECH: T10-T11; IT Animation 1, Assessment 2.1; GO 2.1	
c.	Compare the chemical properties of a compound to the elements that form it.	SE/TE: Can be developed from 39-43, 194-199, 213-216	TR: GRSW 2.1; CTR 2.1 Review TECH: T10-T11; IT Animation 1, Assessment 2.1; GO 2.1	

d	Explain that combining elements in different proportions results in the formation of different compounds with different properties.	SE/TE: 274-279	TR: GRSW 9.5; CTR 9.5 TECH: T100-T103; IT Problem-Solving 9.34, Assessment 9.5	
Objective 3.3: Relate the properties of simple compounds to the force				
a	Generalize, from investigations, the physical properties (e.g., malleability, conductivity, solubility) of substances with different bond types.	SE/TE: Can be developed from 194-200, 201-205, 213-216	TR: GRSW 7.2, 7.3, 8.1; CTR 7.2 Review, 7.3 Review, Interpreting Graphics, 8.1 Review TECH: T79-T81, T82-T84, T85-T86; IT Animations 8, 9, Simulation 5, Problem-Solving 7.12, Assessments 7.2, 7.3, 8.1; GO 7.2, 8.1; Virtual Chemistry Lab 2	
b	Given a model, describe the shape and resulting polarity of water, ammonia, and methane molecules.	SE/TE: 237-244	TR: GRSW 8.4; CTR 8.4 Review TECH: T93; IT Animation 10, Simulation 8, Assessment 8.4; GO 8.4	

c	Identify how intermolecular forces of hydrogen bonds in water affect a variety of physical, chemical, and biological phenomena (e.g., surface tension, capillary action, boiling point).	SE/TE: 237-244, 445-449	TR: GRSW 15.1; CTR 15.1 Review TECH: T160-T161; IT Animations 19, 20, Assessment 15.1	
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STANDARD IV: Students will understand that in chemical reactions matter and energy change forms, but the amounts of matter and energy do not change.

Percentage of coverage in the <i>student and teacher edition</i> for Standard IV: _____ <u>100</u> %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard IV: _____ <u>100</u> %		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition(SE) and Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries⁹</i>
Objective 4.1: Identify evidence of chemical reactions and demonstrate how chemical equations are used to describe them.				
a.	Generalize evidences of chemical reactions.	SE/TE: 53-55, 321-329, 330-339, 342-345, 566-574	TR: GRSW 2.4, 11.1, 11.2, 11.3, 18.4; CTR 2.4 Review, 11.1 Review, 11.2 Review, 11.3 Review, Interpreting Graphics, 18.4 Review, Interpreting Graphics TECH: T18-T19, T113-T117, T118-T120, T121, T206-T208; IT Animation 12, Simulations 11, 12, Problem-Solving 11.2, 11.4, 11.6, 11.14, 11.15, 11.17, 11.18, 11.21, 11.28, Assessments 2.4, 11.1, 11.2, 11.3, 18.4; GO 2.4, 11.1, 11.2, 18.4; Virtual Chemistry Lab 20	
b.	Compare the properties of reactants to the properties of products in a chemical reaction.	SE/TE: Can be developed from 321-329, 330-345	TR: GRSW 11.1; CTR 11.1 Review TECH: T113-T117; IT Animation 12, Simulation 11, Problem-Solving 11.2, 11.4, 11.6, Assessment 11.1; GO 11.1	
c.	Use a chemical equation to describe a simple chemical reaction.	SE/TE: 321-329, 330-345	TR: GRSW 11.1; CTR 11.1 Review TECH: T113-T117; IT Animation 12, Simulation 11, Problem-Solving 11.2, 11.4, 11.6, Assessment 11.1; GO 11.1	

d.	Recognize that the number of atoms in a chemical reaction does not change.	SE/TE: 321-329	TR: GRSW 11.1; CTR 11.1 Review TECH: T113-T117; IT Animation 12, Simulation 11, Problem-Solving 11.2, 11.4, 11.6, Assessment 11.1; GO 11.1	
e.	Determine the molar proportions of the reactants and products in a balanced chemical reaction.	SE/TE: 353-358, 359-366	TR: GRSW 12.1, 12.2; CTR 12.1 Review, 12.2 Review TECH: T122-T125, T126-T132; IT Problem-Solving 12.1, 12.4, 12.12, 12.13, 12.15, 12.19, Simulation 13, Assessments 12.1, 12.2; GO 12.1; Virtual Chemistry Lab 28	
f.	Investigate everyday chemical reactions that occur	SE/TE: Can be developed from 321-329	TR: GRSW 11.1; CTR 11.1 Review TECH: T113-T117; IT Animation 12, Simulation 11, Problem-Solving 11.2, 11.4, 11.6, Assessment 11.1; GO 11.1	

	in a student's home (e.g., baking, rusting, bleaching, cleaning).			
Objective 4.2: Analyze evidence for the laws of conservation of mass and conservation of energy in chemical reactions.				
a.	Using data from quantitative analysis, identify evidence that supports the conservation of mass in a chemical reaction.	SE/TE: 353-358, 359-366	TR: GRSW 12.1, 12.2; CTR 12.1 Review, 12.2 Review TECH: T122-T125, T126-T132; IT Problem-Solving 12.1, 12.4, 12.12, 12.13, 12.15, 12.19, Simulation 13, Assessments 12.1,	

			12.2; GO 12.1; Virtual Chemistry Lab 28	
b.	Use molar relationships in a balanced chemical reaction to predict the mass of product produced in a simple chemical reaction that goes to completion.	SE/TE: 353-358, 359-366	TR: GRSW 12.1, 12.2; CTR 12.1 Review, 12.2 Review TECH: T122-T125, T126-T132; IT Problem-Solving 12.1, 12.4, 12.12, 12.13, 12.15, 12.19, Simulation 13, Assessments 12.1, 12.2; GO 12.1; Virtual Chemistry Lab 28	
c.	Report evidence of energy transformations in a chemical reaction.	SE/TE: 511-517	TR: GRSW 17.2; CTR 17.2 Review, Interpreting Graphics TECH: T183-T186; IT Problem-Solving 17.13, 17.15, Simulation 22, Assessment 17.2; GO 17.2; Virtual Chemistry Labs 17, 19	
d.	After observing or measuring, classify evidence of temperature change in a chemical reaction as endothermic or exothermic.	SE/TE: Can be developed from 511-517	TR: GRSW 17.2; CTR 17.2 Review, Interpreting Graphics TECH: T183-T186; IT Problem-Solving 17.13, 17.15, Simulation 22, Assessment 17.2; GO 17.2; Virtual Chemistry Labs 17, 19	
e.	Using either a constructed or a diagrammed electrochemical cell, describe how electrical energy can be produced in a chemical reaction (e.g., half reaction, electron transfer).	SE/TE: 663-670	TR: GRSW 21.1; CTR 21.1 Review TECH: T242-T245; IT Assessment 21.1; GO 21.1	
f.	Use collected data, report the loss or gain of heat energy in a chemical reaction.	SE/TE: Can be developed from 511-517	TR: GRSW 17.2; CTR 17.2 Review, Interpreting Graphics TECH: T183-T186; IT	

Problem-Solving 17.13,
17.15, Simulation 22,
Assessment 17.2; GO 17.2;
Virtual Chemistry Labs 17,
19

STANDARD V: Students will understand that many factors influence chemical reactions and some reactions can achieve a state of dynamic equilibrium.

Percentage of coverage in the <i>student and teacher edition</i> for Standard V: _____ 100 %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard V: _____ 100%		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition (SE) and Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ⁹
Objective 5.1: Evaluate factors specific to collisions (e.g., temperature, particle size, concentration, and catalysts) that affect the rate of chemical reaction.				
a.	Design and conduct an investigation of the factors affecting reaction rate and use the findings to generalize the results to other reactions.	SE/TE: 541-547	TR: GRSW 18.1; CTR 18.1 Review TECH: T196-T198; IT Animation 22, Simulation 23, Assessment 18.1	
b.	Use information from graphs to draw warranted conclusions about reaction rates.	SE/TE: 541-547	TR: GRSW 18.1; CTR 18.1 Review TECH: T196-T198; IT Animation 22, Simulation 23, Assessment 18.1	
c.	Correlate frequency and energy of collisions to reaction rate.	SE/TE: 541-547	TR: GRSW 18.1; CTR 18.1 Review TECH: T196-T198; IT Animation 22, Simulation 23, Assessment 18.1	

d.	Identify that catalysts are effective in increasing reaction rates.	SE/TE: 541-547	TR: GRSW 18.1; CTR 18.1 Review TECH: T196-T198; IT Animation 22, Simulation 23, Assessment 18.1	
Objective 5.2: Recognize that certain reactions do not convert all reactants to products, but achieve a state of dynamic equilibrium that can be changed.				
a.	Explain the concept of dynamic equilibrium.	SE/TE: 549-559	TR: GRSW 18.2; CTR 18.2 Review TECH: T199-T202; IT Animation 23, Simulation 24, Problem-Solving 18.6, 18.7, 18.9, Assessment 18.2	
b.	Given an equation, identify the effect of adding either product or reactant to a shift in equilibrium.	SE/TE: 549-559	TR: GRSW 18.2; CTR 18.2 Review TECH: T199-T202; IT Animation 23, Simulation 24, Problem-Solving 18.6, 18.7, 18.9, Assessment 18.2	

c.	Indicate the effect of a temperature change on the equilibrium, using an equation showing a heat term.	SE/TE: 549-559	TR: GRSW 18.2; CTR 18.2 Review TECH: T199-T202; IT Animation 23, Simulation 24, Problem-Solving 18.6, 18.7, 18.9, Assessment 18.2	
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STANDARD VI: Students will understand the properties that describe solutions in terms of concentration, solutes, solvents, and the behavior of acids and bases.

Percentage of coverage in the <i>student and teacher edition</i> for Standard VI: _____ <u>100</u> %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard VI: _____ <u>93</u> %		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition (SE) and Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries⁹</i>
Objective 6.1: Describe factors affecting the process of dissolving and evaluate the effects that changes in concentration have on solutions.				
a.	Use the terms solute and solvent in describing a solution.	SE/TE: 450-457	TR: GRSW 15.2; CTR 15.2 Review TECH: T162-T165; IT Simulations 18, 19, Problem-Solving 15.6, Assessment 15.2, Virtual Chemistry Lab 21	
b.	Sketch a solution at the particle level.	SE/TE: 450-457	TR: GRSW 15.2; CTR 15.2 Review TECH: T162-T165; IT Simulations 18, 19, Problem-Solving 15.6, Assessment 15.2, Virtual Chemistry Lab 21	
c.	Describe the relative amount of solute particles in concentrated and dilute solutions and express concentration in terms of molarity and molality.	SE/TE: 480-486	TR: GRSW 16.2; CTR 16.2 Review TECH: T171-T174; IT Problem-Solving 16.8, 16.11, 16.12, 16.14, Assessment 16.2	
d.	Design and conduct an experiment to determine the factors (e.g., agitation, particle size, temperature) affecting the relative rate of dissolution.	SE/TE: Can be developed from 471-477	TR: GRSW 16.1; CTR 16.1 Review, Interpreting Graphics TECH: T169-T170, IT Simulation 20, Problem-Solving 16.2, Assessment 16.1; GO 16.1	

e.	Relate the concept of parts per million (PPM) to relevant environmental issues found through research.	SE/TE: Can be developed from 12-17	TR: GRSW 1.2; CTR 1.2 Review TECH: T3-T4; IT Assessment 1.2	
Objective 6.2: Summarize the quantitative and qualitative				

effects of colligative properties on a solution when a solute is added.				
a.	Identify the colligative properties of a solution.	SE/TE: 487-490	TR: GRSW 16.3; CTR 16.3 Review TECH: T175-T176; IT Assessment 16.3; GO 16.3	
b.	Measure change in boiling and/or freezing point of a solvent when a solute is added.	SE/TE: Can be developed from 487-490, 491-496	TR: GRSW 16.3; CTR 16.3 Review TECH: T175-T176; IT Assessment 16.3; GO 16.3	
c.	Describe how colligative properties affect the behavior of solutions in everyday applications (e.g., road salt, cold packs, antifreeze).	SE/TE: Can be developed from 487-490, 491-496	TR: GRSW 16.3, 16.4; CTR 16.3 Review TECH: T175-T176, T177-T179; IT Problem-Solving 16.29, 16.31, 16.33, 16.36, Simulation 21, Assessments 16.3, 16.4; GO 16.3	
Objective 6.3: Differentiate between acids and bases in terms of hydrogen ion concentration.				
a.	Relate hydrogen ion concentration to pH values and to the terms acidic, basic, or neutral.	SE/TE: 594-604	TR: GRSW 19.2; CTR 19.2 Review TECH: T215-T222; IT Problem-Solving 19.10, 19.12, 19.14, 19.15,	

			Assessment 19.2; GO 19.2	
b.	Using an indicator, measure the pH of common household solutions and standard laboratory solutions, and identify them as acids or bases.	SE/TE: 594-604	TR: GRSW 19.2; CTR 19.2 Review TECH: T215-T222; IT Problem-Solving 19.10, 19.12, 19.14, 19.15, Assessment 19.2; GO 19.2	
c.	Determine the concentration of an acid or a base using a simple acid-base titration.	SE/TE: 612-616	TR: GRSW 19.4; CTR 19.4 Review TECH: T225-T226; IT Problem-Solving 19.30, 19.33, Simulation 26, Assessment 19.4	
d.	Research and report on the uses of acids and bases in industry, agriculture, medicine, mining, manufacturing, or construction.	SE/TE: Can be developed from 590, 593, 595, 603, 605, 607, 608, 611, 612, R7, R25, R30, R33		
e.	Evaluate mechanisms by which pollutants modify the pH of various environments (e.g., aquatic, atmospheric,	SE/TE: CB DF 594-604, R27	TR: GRSW 19.2; CTR 19.2 Review TECH: T215-T222; IT Problem-Solving 19.10, 19.12, 19.14, 19.15, Assessment 19.2; GO 19.2	