



# CHEMISTRY

## MATTER AND CHANGE

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ELIGIBLE CONTENT	PAGE REFERENCES
<b>MODULE A—Structure and Properties of Matter</b>	
<b>ASSESSMENT ANCHOR</b>	
<b>CHEM.A.1 Properties and Classification of Matter</b>	
<b>Anchor Descriptor</b>	
<b>CHEM.A.1.1</b> Identify and describe how observable and measurable properties can be used to classify and describe matter and energy.	
<b>CHEM.A.1.1.1</b> Classify physical or chemical changes within a system in terms of matter and/or energy.	<b>Student Edition:</b> 76-77, 216-217, 247, 530-531 <i>Chapter Assessment</i> 94 #42-#45 <i>ChemLab</i> 92, 230 <i>Launch Lab</i> 69, 281 <i>Section Assessment</i> 79 #10-#12  <b>Teacher Wraparound Edition:</b> CU 79, 533; D 284-285; E 246; QD 530

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<p><b>CHEM.A.1.1.2</b> Classify observations as qualitative and/or quantitative.</p>	<p><b>Student Edition:</b> 13 <i>Chapter Assessment 26 #39</i> <i>ChemLab 24</i> <i>Section Assessment 16 #16</i></p> <p><b>Teacher Wraparound Edition:</b> CJ 14; CU 16</p>
<p><b>CHEM.A.1.1.3</b> Utilize significant figures to communicate the uncertainty in a quantitative observation.</p>	<p><b>Student Edition:</b> 50-54 <i>Chapter Assessment 63 #88-#92</i> <i>Math Handbook 949-953</i> <i>Problem-Solving Lab 50</i></p> <p><b>Teacher Wraparound Edition:</b> CP 51; DI 52; IM 51; MC 52; R 52, 53, 336</p>
<p><b>CHEM.A.1.1.4</b> Relate the physical properties of matter to its atomic or molecular structure.</p>	<p><b>Student Edition:</b> 212-215, 267-270, 757-758 <i>Chapter Assessment 232 #63; 275 #116</i> <i>ChemLab 230, 272</i> <i>Launch Lab 239</i> <i>MiniLab 227, 242</i></p> <p><b>Teacher Wraparound Edition:</b> A 270; CJ 268; E 75; MC 214; QD 211; R 270</p>
<p><b>CHEM.A.1.1.5</b> Apply a systematic set of rules (IUPAC) for naming compounds and writing chemical formulas (e.g., binary covalent, binary ionic, ionic compounds containing polyatomic ions).</p>	<p><b>Student Edition:</b> 222-224, 248-252 <i>Chapter Assessment 233 #82-#86; 274 #93-#96</i> <i>ChemLab 230</i></p> <p><b>Teacher Wraparound Edition:</b> A 222, 223, 224, 250; CJ 222, 251; CP 250; CU 224; R 224; VL 248</p>

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<p><b>Anchor Descriptor</b></p> <p><b>CHEM.A.1.2 Compare the properties of mixtures.</b></p>		
<b>CHEM.A.1.2.1</b>	Compare properties of solutions containing ionic or molecular solutes (e.g., dissolving, dissociating).	<p><b>Student Edition:</b> 215, 268, 299-300, 490-491 <i>Launch Lab</i> 205</p> <p><b>Teacher Wraparound Edition:</b> CJ 268; QD 211; VL 299</p>
<b>CHEM.A.1.2.2</b>	Differentiate between homogeneous and heterogeneous mixtures (e.g., how such mixtures can be separated).	<p><b>Student Edition:</b> 80-83 <i>Chapter Assessment</i> 95 #61; 96 #82, #89 <i>ChemLab</i> 92</p> <p><b>Teacher Wraparound Edition:</b> CJ 81; DI 80; R 83</p>
<b>CHEM.A.1.2.3</b>	Describe how factors (e.g., temperature, concentration, surface area) can affect solubility.	<p><b>Student Edition:</b> 492-497 <i>Chapter Assessment</i> 509 #87; 510 #107 <i>ChemLab</i> 506</p> <p><b>Teacher Wraparound Edition:</b> CD 493; CJ 494; D 492-493; MI 489; VL 494</p>
<b>CHEM.A.1.2.4</b>	Describe various ways that concentration can be expressed and calculated (e.g., molarity, percent by mass, percent by volume).	<p><b>Student Edition:</b> 480-488 <i>Chapter Assessment</i> 508-509 #62-#85</p> <p><b>Teacher Wraparound Edition:</b> A 485; CJ 482, 483; CU 488; E 488; MC 483; MI 480; QD 484; R 487, 488</p>
<b>CHEM.A.1.2.5</b>	Describe how chemical bonding can affect whether a substance dissolves in a given liquid.	<p><b>Student Edition:</b> 268, 489-491 <i>Chapter Assessment</i> 510 #104</p> <p><b>Teacher Wraparound Edition:</b> CJ 268; MI 489</p>

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<p><b>ASSESSMENT ANCHOR</b></p>	
<p><b>CHEM.A.2 Atomic Structure and the Periodic Table</b></p>	
<p><b>Anchor Descriptor</b></p>	
<p><b>CHEM.A.2.1 Explain how atomic theory serves as the basis for the study of matter.</b></p>	
<p><b>CHEM.A.2.1.1</b> Describe the evolution of atomic theory leading to the current model of the atom based on the works of Dalton, Thomson, Rutherford, and Bohr.</p>	<p><b>Student Edition:</b> 102-114, 146-155 <i>Chapter Assessment</i> 128 #36; 130 #92; 167 #59; 169 #116</p> <p><b>Teacher Wraparound Edition:</b> A 147; CJ 110; CP 153; D 106-107, 112-113; DI 109, 111; E 104; R 114</p>
<p><b>CHEM.A.2.1.2</b> Differentiate between the mass number of an isotope and the average atomic mass of an element.</p>	<p><b>Student Edition:</b> 117-121 <i>Chapter Assessment</i> 129 #77, #78 <i>ChemLab</i> 126 <i>MiniLab</i> 120</p> <p><b>Teacher Wraparound Edition:</b> CU 121; DI 119; ICE 121; MC 118</p>
<p><b>Anchor Descriptor</b></p>	
<p><b>CHEM.A.2.2 Describe the behavior of electrons in atoms.</b></p>	
<p><b>CHEM.A.2.2.1</b> Predict the ground state electronic configuration and/or orbital diagram for a given atom or ion.</p>	<p><b>Student Edition:</b> 153-160, 182-186 <i>Chapter Assessment</i> 167 #85, #86; 198 #47; 199 #54, #55 <i>Section Assessment</i> 162 #29</p> <p><b>Teacher Wraparound Edition:</b> A 159, 185; VL 158</p>
<p><b>CHEM.A.2.2.2</b> Predict characteristics of an atom or an ion based on its location on the periodic table (e.g., number of valence electrons, potential types of bonds, reactivity).</p>	<p><b>Student Edition:</b> 177-185, 187-194, 265-266 <i>ChemLab</i> 196 <i>Problem-Solving Lab</i> 180, 294</p> <p><b>Teacher Wraparound Edition:</b> A 183; CJ 184; D 190-191; E 181; ICE 189; IM 176</p>

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<p><b>CHEM.A.2.2.3</b> Explain the relationship between the electron configuration and the atomic structure of a given atom or ion (e.g., energy levels and/or orbitals with electrons, distribution of electrons in orbitals, shapes of orbitals).</p>	<p><b>Student Edition:</b> 153-161 <i>Chapter Assessment</i> 167 #85, #86; 169 #109</p> <p><b>Teacher Wraparound Edition:</b> A 159; BM 157; CJ 154; DI 160; MI 156; RS 165</p>
<p><b>CHEM.A.2.2.4</b> Relate the existence of quantized energy levels to atomic emission spectra.</p>	<p><b>Student Edition:</b> 141-148 <i>Chapter Assessment</i> 167 #65; 169 #118 <i>ChemLab</i> 164 <i>MiniLab</i> 144 <i>Problem-Solving Lab</i> 150 <i>Section Assessment</i> 155 #15</p> <p><b>Teacher Wraparound Edition:</b> A 147, 150; D 156-157; QD 148</p>
<p><b>Anchor Descriptor</b> <b>CHEM.A.2.3</b> Explain how periodic trends in the properties of atoms allow for the prediction of physical and chemical properties.</p>	
<p><b>CHEM.A.2.3.1</b> Explain how the periodicity of chemical properties led to the arrangement of elements on the periodic table.</p>	<p><b>Student Edition:</b> 174-181 <i>ChemLab</i> 196 <i>Problem-Solving Lab</i> 180</p> <p><b>Teacher Wraparound Edition:</b> DI 175; IM 176; R 179</p>
<p><b>CHEM.A.2.3.2</b> Compare and/or predict the properties (e.g., electron affinity, ionization energy, chemical reactivity, electronegativity, atomic radius) of selected elements by using their locations on the periodic table and known trends.</p>	<p><b>Student Edition:</b> 187-194, 265-266 <i>Chapter Assessment</i> 200 #70-#72, #87; 201 #97 <i>ChemLab</i> 196 <i>MiniLab</i> 193 <i>Problem-Solving Lab</i> 180, 294</p> <p><b>Teacher Wraparound Edition:</b> CJ 184; CP 188; CU 194; D 190-191; DI 187; ICE 189; IM 176; MC 191; QD 192</p>

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<b>MODULE B—The Mole Concept and Chemical Interactions</b>	
<b>ASSESSMENT ANCHOR</b>	
<b>CHEM.B.1 The Mole and Chemical Bonding</b>	
<b>Anchor Descriptor</b>	
<b>CHEM.B.1.1 Explain how the mole is a fundamental unit of chemistry.</b>	
<b>CHEM.B.1.1.1</b> Apply the mole concept to representative particles (e.g., counting, determining mass of atoms, ions, molecules, and/or formula units).	<b>Student Edition:</b> 320-340 <i>Chapter Assessment</i> 358-360 #90-#101, #108-#120, #128-#152 <i>Launch Lab</i> 319 <i>Problem-Solving Lab</i> 326 <b>Teacher Wraparound Edition:</b> A 321, 324, 329, 336, 339; CJ 329; CP 325; CU 332, 340; DI 327; QD 321
<b>Anchor Descriptor</b>	
<b>CHEM.B.1.2 Apply the mole concept to the composition of matter.</b>	
<b>CHEM.B.1.2.1</b> Determine the empirical and molecular formulas of compounds.	<b>Student Edition:</b> 344-350 <i>Chapter Assessment</i> 360 #154-#157; 361 #164, #165, #167, #172, #173 <b>Teacher Wraparound Edition:</b> A 348, 350; CD 344, 345; CU 349; D 344-345; MI 341; R 349; VL 346
<b>CHEM.B.1.2.2</b> Apply the law of definite proportions to the classification of elements and compounds as pure substances.	<b>Student Edition:</b> 87-88 <i>Section Assessment</i> 90 #26 <b>Teacher Wraparound Edition:</b> QD 88
<b>CHEM.B.1.2.3</b> Relate the percent composition and mass of each element present in a compound.	<b>Student Edition:</b> 341-344 <i>Chapter Assessment</i> 361 #165, #166, #168-#171 <i>MiniLab</i> 342 <i>Section Assessment</i> 350 #70 <b>Teacher Wraparound Edition:</b> CJ 342, 343; CU 349; DI 341; QD 343

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<p><b>Anchor Descriptor</b></p> <p><b>CHEM.B.1.3</b> Explain how atoms form chemical bonds.</p>	
<p><b>CHEM.B.1.3.1</b> Explain how atoms combine to form compounds through ionic and covalent bonding.</p>	<p><b>Student Edition:</b> 210-212, 240-246 <i>Chapter Assessment</i> 232 #61; 274 #79 <i>ChemLab</i> 230</p> <p><b>Teacher Wraparound Edition:</b> A 245; BM 243; CJ 214, 241; CP 210; D 248-249; MI 240</p>
<p><b>CHEM.B.1.3.2</b> Classify a bond as being polar covalent, non-polar covalent, or ionic.</p>	<p><b>Student Edition:</b> 265-268 <i>ChemLab</i> 272 <i>Section Assessment</i> 270 #74-#77</p> <p><b>Teacher Wraparound Edition:</b> A 267; CJ 267; IM 266</p>
<p><b>CHEM.B.1.3.3</b> Use illustrations to predict the polarity of a molecule.</p>	<p><b>Student Edition:</b> 267-268 <i>Chapter Assessment</i> 275 #123 <i>ChemLab</i> 272 <i>Section Assessment</i> 270 #77</p> <p><b>Teacher Wraparound Edition:</b> A 267; CJ 268</p>
<p><b>Anchor Descriptor</b></p> <p><b>CHEM.B.1.4</b> Explain how models can be used to represent bonding.</p>	
<p><b>CHEM.B.1.4.1</b> Recognize and describe different types of models that can be used to illustrate the bonds that hold atoms together in a compound (e.g., computer models, ball-and-stick models, graphical models, solid-sphere models, structural formulas, skeletal formulas, Lewis dot structures).</p>	<p><b>Student Edition:</b> 253-257, 261-264, 746 <i>ChemLab</i> 272 <i>Launch Lab</i> 743</p> <p><b>Teacher Wraparound Edition:</b> A 245; BM 243; CD 254; E 749; IM 286; MC 262; QD 261; R 263, 774; VL 253, 259</p>

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<b>CHEM.B.1.4.2</b> Utilize Lewis dot structures to predict the structure and bonding in simple compounds.	<b>Student Edition:</b> 242-244, 254-257 <i>Chapter Assessment 275 #123</i> <b>Teacher Wraparound Edition:</b> A 245, 257; BM 243; CD 254; CJ 255; DI 256; VL 253
<b>ASSESSMENT ANCHOR</b> <b>CHEM.B.2 Chemical Relationships and Reactions</b> <b>Anchor Descriptor</b> <b>CHEM.B.2.1 Predict what happens during a chemical reaction.</b>	
<b>CHEM.B.2.1.1</b> Describe the roles of limiting and excess reactants in chemical reactions.	<b>Student Edition:</b> 379-384 <i>Chapter Assessment 394 #74-#76</i> <b>Teacher Wraparound Edition:</b> A 381, 383, 384; CP 380; D 382-383; IM 380; MI 379; R 384
<b>CHEM.B.2.1.2</b> Use stoichiometric relationships to calculate the amounts of reactants and products involved in a chemical reaction.	<b>Student Edition:</b> 373-377 <i>Chapter Assessment 393-394 #60-#72</i> <i>ChemLab 390</i> <i>MiniLab 378</i> <i>Section Assessment 378 #20-#22</i> <b>Teacher Wraparound Edition:</b> A 374; CJ 375; CU 377; ICE 375, 376, 377; R 377; RS 391
<b>CHEM.B.2.1.3</b> Classify reactions as synthesis, decomposition, single replacement, double replacement, or combustion.	<b>Student Edition:</b> 289-298, 533 <i>Chapter Assessment 313 #81-#83; 314 #106, #109, #112</i> <i>ChemLab 310, 550</i> <b>Teacher Wraparound Edition:</b> CB 292; CJ 293; CP 289, 292, 296; D 752-753; QD 293, 368; R 298

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<p><b>CHEM.B.2.1.4</b> Predict products of simple chemical reactions (e.g., synthesis, decomposition, single replacement, double replacement, combustion).</p>	<p><b>Student Edition:</b> 289-298, 300-307 <i>Chapter Assessment</i> 313 #85-#88, #96, #97 <i>ChemLab</i> 310 <i>MiniLab</i> 301</p> <p><b>Teacher Wraparound Edition:</b> A 307; CB 292; CJ 293; CU 308; ICE 295, 304; QD 293</p>
<p><b>CHEM.B.2.1.5</b> Balance chemical equations by applying the Law of Conservation of Matter.</p>	<p><b>Student Edition:</b> 285-288 <i>Chapter Assessment</i> 313 #84-#88; 314 #108, #111, #113 <i>ChemLab</i> 310, 390 <i>MiniLab</i> 301</p> <p><b>Teacher Wraparound Edition:</b> A 287; CP 373; CU 371; D 248-249; DI 286; ICE 287; IM 286; R 288</p>
<p><b>Anchor Descriptor</b> <b>CHEM.B.2.2</b> Explain how the kinetic molecular theory relates to the behavior of gases.</p>	
<p><b>CHEM.B.2.2.1</b> Utilize mathematical relationships to predict changes in the number of particles, the temperature, the pressure, and the volume in a gaseous system (i.e., Boyle's law, Charles's law, Dalton's law of partial pressures, the combined gas law, and the ideal gas law).</p>	<p><b>Student Edition:</b> 408-410, 442-456 <i>Chapter Assessment</i> 434 #45, #46; 468-469 #55-#60, #67-#78 <i>ChemLab</i> 466 <i>MiniLab</i> 457</p> <p><b>Teacher Wraparound Edition:</b> A 448, 454; BM 448; D 442-443; DI 449, 450; ICE 409, 443, 446, 448, 450, 453</p>
<p><b>CHEM.B.2.2.2</b> Predict the amounts of reactants and products involved in a chemical reaction using molar volume of a gas at STP.</p>	<p><b>Student Edition:</b> 460-463 <i>Chapter Assessment</i> 469 #84-#90 <i>Section Assessment</i> 464 #46</p> <p><b>Teacher Wraparound Edition:</b> CU 464; ICE 461, 463; R 464</p>