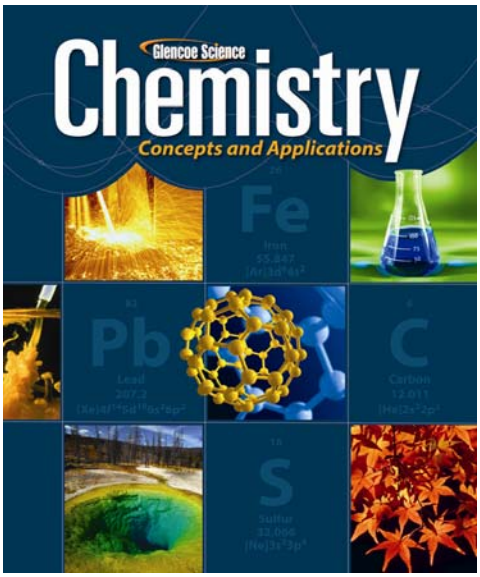
Mississippi



Chemistry

Concepts and Applications

STANDARDS	PAGE REFERENCES
INQUIRY	
1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.	
a. Use current technologies such as CD-ROM, DVD, Internet, and on-line data search to explore current research related to a specific topic. (DOK 3)	**Student Edition:** *Chemistry Online* 415 *Concepts in Motion* 73, 229, 321, 407, 557, 686, 715 **Teacher Wraparound Edition:** CO 556; GT 72, 206, 320, 409, 420, 442, 556, 745
b. Clarify research questions and design laboratory investigations. (DOK 3)	**Student Edition:** *Discuss the Technology* 325 *Inquiry Extension* 19, 327, 749 *Launch Lab* 255, 337, 479 **Teacher Wraparound Edition:** A 441, 493; CJ 459; E 273, 278, 525

STANDARDS	PAGE REFERENCES
c. Demonstrate the use of scientific inquiry and methods to formulate, conduct, and evaluate laboratory investigations (e.g., hypotheses, experimental design, observations, data analyses, interpretations, theory development). (DOK 3)	**Student Edition:** *Inquiry Extension* 327 *Launch Lab* 255 *Mini Lab* 408 **Teacher Wraparound Edition:** A 441, 457, 499, 533, 651; CJ 459; E 273, 278, 525, 546, 728
d. Organize data to construct graphs (e.g., plotting points, labeling x-and y-axis, creating appropriate titles and legends for circle, bar, and line graphs), draw conclusions, and make inferences. (DOK 3)	**Student Edition:** *CHEMLAB* 98-99, 360-361, 386-387, 674-675, 748-749 *Inquiry Extension* 721 *Mini Lab* 244 **Teacher Wraparound Edition:** A 99, 361, 383, 387, 749
e. Evaluate procedures, data, and conclusions to critique the scientific validity of research. (DOK 3)	**Student Edition:** *CHEMLAB* 134-135, 234-235, 386-387, 456-457, 720-721, 748-749 *Inquiry Extension* 205 **Teacher Wraparound Edition:** A 235, 443
f. Formulate and revise scientific explanations and models using logic and evidence (data analysis). (DOK 3)	**Student Edition:** *CHEMLAB* 54-55, 98-99, 170-171, 326-327, 456-457, 675 *Connection to Chemistry* 411 *Inquiry Extension* 135, 651 *Launch Lab* 49 *Mini Lab* 164, 260, 355 **Teacher Wraparound Edition:** A 55, 171, 239, 443, 499, 637; UA 9
g. Collect, analyze, and draw conclusions from data to create a formal presentation using available technology (e.g.,computers, calculators, SmartBoard, CBL's, etc.) (DOK 3)	**Student Edition:** **Teacher Wraparound Edition:** A 753; CJ 610, 686; E 614, 646; TS 537

STANDARDS	PAGE REFERENCES
Physical Science	
2. Demonstrate an understanding of the atomic model of matter by explaining atomic structure and chemical bonding.	
a. Describe and classify matter based on physical and chemical properties and interactions between molecules or atoms. (DOK 1) • Physical properties (e.g., melting points, densities, boiling points) of a variety of substances	**Student Edition:** 20, 32-34, 38, 330 *CHEMLAB* 18-19 *Figure 1.13* 20 *Figure 1.23* 35 *Figure 1.24* 39 **Teacher Wraparound Edition:** CB 33; CD 15; CU 330; Di 39; IM 24, 32; TPK 15, 16
• Substances and mixtures	**Student Edition:** 14-16, 21-25 *Figure 1.12* 16 *Figure 1.15* 24 *Section 1.1 Assessment* 31 #2 **Teacher Wraparound Edition:** A 21; Di 14, 15; E 31; IM 23
• Three states of matter in terms of internal energy, molecular motion, and the phase transitions between them	**Student Edition:** 338-343, 345, 350, 354-356, 362-363 *CHEMLAB* 360-361 *Figure 10.6* 342 *Figure 10.7* 343 *Mini Lab* 341, 355 **Teacher Wraparound Edition:** A 341, 355; CD 338; CU 345; DI 340; E 345, 362; IM 343; QD 354
b. Research and explain crucial contributions and critical experiments of Dalton, Thomson, Rutherford, Bohr, de Broglie, and Schrődinger and describe how each discovery contributed to the current model of atomic and nuclear structure. (DOK 2)	**Student Edition:** 52-53, 59-63, 228-229, 238-239 *Figure 7.1* 228 *Physics Connection* 230 **Teacher Wraparound Edition:** C 66; D 58-59; GT 59, 62; TS 230; VL 59

STANDARDS	PAGE REFERENCES
c. Develop a model of atomic and nuclear structure based on theory and knowledge of fundamental particles. (DOK 2) • Properties and interactions of the three fundamental particles of the atom	**Student Edition:** 75, 229, 231, 239-240 *Figure 2.10* 63 *Figure 2.11* 64 *Figure 2.22* 75 *Figure 2.23* 76 *Figure 7.3* 229 **Teacher Wraparound Edition:** CJ 76; GT 76, 231; IM 63; TPK 231
• Laws of conservation of mass, constant composition, definite proportions, and multiple proportions	**Student Edition:** 42, 52, 196 *CHEMLAB* 54-55 **Teacher Wraparound Edition:** A 55; D 34-35, 52-53; Di 42; MI 188; QD 196; Tr 52, 747
d. Write appropriate equations for nuclear decay reactions, describe how the nucleus changes during these reactions, and compare the resulting radiation with regard to penetrating ability. (DOK 1) • Three major types of radioactive decay (e.g., alpha, beta, gamma) and the properties of the emissions (e.g., composition, mass, charge, penetrating power)	**Student Edition:** 743, 745-746 *Example and Practice Problems* 747 *Everyday Chemistry* 771 *Figure 21.5* 743 *Supplemental Practice* 842 #1 **Teacher Wraparound Edition:** CD 743; CJ 747; ICE 747; R 743, 745
• The concept of half-life for a radioactive isotope (e.g., carbon-14 dating) based on the principle that the decay of any individual atom is a random process	**Student Edition:** 752-753 *CHEMLAB* 748-749 *CHEMISTRY AND TECHNOLOGY* 750-751 *Example and Practice Problems* 755 *Figure 21.8* 752 **Teacher Wraparound Edition:** A 752; CD 753; D 752-753; DI 754; TS 750

STANDARDS	PAGE REFERENCES
e. Compare the properties of compounds according to their type of bonding. (DOK 1) • Covalent, ionic, and metallic bonding	**Student Edition:** 304, 306-307, 311-312, 328-331 *Concepts in Motion* 308 *Figure 9.5* 304 *Figure 9.12* 312 *History Connection* 305 *Practice Problems* 310 **Teacher Wraparound Edition:** CB 308; CU 311; DD 298-299; GT 304; IM 306; R 312; TS 305
• Polar and non-polar covalent bonding	**Student Edition:** 307-309, 328-331 *Chemistry Online* 329 *Figure 9.7* 307 *Figure 9.9* 309 *Figure 9.23* 329 *Mini Lab* 310 *Practice Problems* 310 *Section 9.1 Assessment* 312 **Teacher Wraparound Edition:** A 310; CJ 330; DI 328; ICE 311; UA 308; VL 307, 329
• Valence electrons and bonding atoms	**Student Edition:** 76-77, 129-131, 136-139, 300-303, 306-307 *CHEMLAB* 234-235 *Concepts in Motion* 131 *Figure 4.17* 131 *Figure 4.20* 137 *Figure 4.22* 139 *Mini Lab* 133 **Teacher Wraparound Edition:** A 235; CB 129; DI 133; E 139; Tr 303; VL 307

STANDARDS	PAGE REFERENCES
f. Compare different types of intermolecular forces and explain the relationship between intermolecular forces, boiling points, and vapor pressure when comparing differences in properties of pure substances. (DOK 1)	**Student Edition:** 142, 330-331, 342-343, 437-439, 442-446 *Figure 4.25* 142 *Figure 9.25* 330 *Figure 13.3 & Figure 13.4* 438 *Figure 13.10* 444 *Table 13.2* 439 **Teacher Wraparound Edition:** CD 142, 257, 358; CJ 437, 442, 453; DI 439; IM 438; TPK 444; VL 440, 445
g. Develop a three-dimensional model of molecular structure. (DOK 2) • Lewis dot structures for simple molecules and ionic compounds	**Student Edition:** 77, 131, 137, 139, 306, 313-314, 319-323 *Figure 2.24* 77 *Figure 4.20* 137 *Mini Lab* 323 **Teacher Wraparound Edition:** A 323; CD 319; E 139; D 320-321; Tr 303, 322
• Valence shell electron pair repulsion theory (VSEPR)	**Student Edition:** 319-323 *Figure 9.15* 315 *Figure 9.16* 319 *Figure 9.17* 320 *Figure 9.18 & Figure 9.19* 321 *Figure 9.20* 322 *Figure 9.21* 323 *Mini Lab* 323 **Teacher Wraparound Edition:** A 323; CB 314; CD 320; D 314-315, 320-321; DI 319; E 321; UA 320

STANDARDS	PAGE REFERENCES
3. Develop an understanding of the periodic table.	
a. Calculate the number of protons, neutrons, and electrons in individual isotopes using atomic numbers and mass numbers, write electron configurations of elements and ions following the Aufbau principle, and balance equations representing nuclear reactions. (DOK 1)	**Student Edition:** 64-66, 233, 242-245, 743, 745-746 *Example and Practice Problems* 747 *Figure 2.11* 64 *Figure 7.12* 242 *Table 7.2* 243 **Teacher Wraparound Edition:** CD 242, 243; D 246-247; DI 745; ICE 747; IM 64; R 743, 745; Tr 747; VL 245
b. Analyze patterns and trends in the organization of elements in the periodic table and compare their relationship to position in the periodic table. (DOK 2) • Atomic number, atomic mass, mass number, and number of protons, electrons, and neutrons in isotopes of elements	**Student Edition:** 64-65, 93-94, 96-97, 229 *Figure 2.11* 64 *Figure 2.12* 65 *Figure 3.6* 90-91 *Figure 3.11* 97 *Table 3.2* 86 **Teacher Wraparound Edition:** CIM 229; D 90; TPK 231
• Average atomic mass calculations	**Student Edition:** 65-66 *Figure 2.13* 66 **Teacher Wraparound Edition:** CB 65; D 64-65; UA 65

STANDARDS	PAGE REFERENCES
• Chemical characteristics of each region	**Student Edition:** 101-103, 261, 264, 268-269, 271, 274, 276, 279, 292-293 *CHEMLAB* 266-267 *Figure 3.14* 102 *Figure 8.8* 262-263 *Figure 8.10* 265 *Figure 8.11* 268-269 *Figure 8.14* 272 *Figure 8.16* 275 **Teacher Wraparound Edition:** A 267; CU 279; D 264-265, 268-269; GT 262; QD 265; Re 279
• Periodic properties (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius)	**Student Edition:** 241-245, 280-281 *CHEMLAB* 98 *Figure 3.*17 104-105 *Figure 8.3* 257 *Figure 8.6* 259 *Figure 9.2* 302 *Figure 9.4* 303 *Launch Lab* 255 *Mini Lab* 87, 96 **Teacher Wraparound Edition:** CIM 302; D 104-105; DD 82-83, 254-255; Di 279; R 104; VL 257, 259
c. Classify chemical reactions by type. (DOK 2) • Single displacement, double displacement, synthesis (combination), decomposition, disproportionation, combustion, or precipitation.	**Student Edition:** 202-203, 206 *CHEMLAB* 204-205 *Figure 6.12* 206 *Mini Lab* 203 *Section 6.2 Assessment* 207 *Table 6.1* 207 **Teacher Wraparound Edition:** D 202-203; GT 206; P 207; QD 206; Re 207

STANDARDS	PAGE REFERENCES
• Products (given reactants) or reactants (given products) for each reaction type	**Student Edition:** *Example and Practice Problems* 521, 529 *Launch Lab* 553 *Mini Lab* 482 *Table 6.1* 207 **Teacher Wraparound Edition:** A 452, 482, 718; CU 207; DD 702-703; GT 220; ICE 521; VL 190, 516, 555
• Solubility rules for precipitation reactions and the activity series for single and double displacement reactions	**Student Edition:** 482-483 *Figure 14.3* 482 *Reference Tables* 856
d. Use stoichiometry to calculate the amount of reactants consumed and products formed. (DOK 3) • Difference between chemical reactions and chemical equations	**Student Edition:** 190-191 *Section 6.1 Summary* 199 **Teacher Wraparound Edition:** FT 188; GT 220
• Formulas and calculations of the molecular (molar) masses	**Student Edition:** 406-407 *Chapter 12 Assessment* 430 #38 *Example and Practice Problems* 410, 414-145 *Figure 12.6* 407 *Supplemental Practice* 824-285 #2, #13 **Teacher Wraparound Edition:** CD 414; GT 409; Re 412
• Empirical formula given the percent composition of elements	**Student Edition:** 426 *Figure 12.13* 426 *Supplemental Practice* 826 #32 **Teacher Wraparound Edition:** CD 426; D 406-407

STANDARDS	PAGE REFERENCES
• Molecular formula given the empirical formula and molar mass	**Student Edition:** 427-428 *Chapter 12* 431 #44 *Supplemental Practice* 826 #33
4. Analyze the relationship between microscopic and macroscopic models of matter.	
a. Analyze the nature and behavior of gaseous, liquid, and solid substances using the kinetic molecular theory. (DOK 3)	**Student Edition:** 340-343 *Figure 10.4* 340 *Figure 10.6* 342 *Figure 10.7* 343 *Mini Lab* 341 *Section 10.1 Assessment* 345 #1 **Teacher Wraparound Edition:** A 341; CU 345; DI 340; E 343, 345; IM 343
b. Use the ideal gas laws to explain the relationships between volume, temperature, pressure, and quantity in moles. (DOK 2) • Difference between ideal and real gas	**Student Edition:** 340-341 **Teacher Wraparound Edition:** CB 370
• Assumptions made about an ideal gas	**Student Edition:** 340-341 **Teacher Wraparound Edition:** CB 370; IM 419
• Conditions that favor an ideal gas	**Student Edition:** 340-341 **Teacher Wraparound Edition:** CB 370; IM 419
c. Use the gas laws of Boyles, Charles, Gay-Lussac, and Dalton to solve problems based on the laws. (DOK 2)	**Student Edition:** *Chapter 11 Assessment* 398-399 *CHEMLAB* 386-387 *Example and Practice Problems* 384-385, 391, 393-394 *Supplemental Practice* 822-824 **Teacher Wraparound Edition:** CD 392; D 382-383; ICE 385, 390, 393

STANDARDS	PAGE REFERENCES
d. Explain the thermodynamics associated with physical and chemical concepts related to temperature, entropy, enthalpy, and heat energy. (DOK 2) • Specific heat as it relates to the conservation of energy	**Student Edition:** 444-445, 712-713, 715 **Teacher Wraparound Edition:** CB 704; CD 713; Di 717; E 713, 728; IM 717; QD 716; TPK 444; VL 445
• Amount of heat absorbed or released in a process, given mass, specific heat, and temperature change	**Student Edition:** 715 *CHEMLAB* 720-721 *Section 20.2 Assessment* 728 #13 **Teacher Wraparound Edition:** CD 715; CIM 715; E 728; ICE 716, 718
• Energy (in calories and joules) required to change the state of a sample of a given substance, using its mass and its heat of vaporization or heat of fusion.	**Student Edition:** CHEMLAB 360-361, 720-721 *Example and Practice Problems* 716 **Teacher Wraparound Edition:** A 361
• Endothermic or exothermic changes	**Student Edition:** 40-41, 193-194, 704-705 *Figure 20.1* 704 *Mini Lab* 194, 708, 722 **Teacher Wraparound Edition:** A 194; D 40-41, 722-723; Di 709; GT 40, 705; QD 41,691, 716; Re 42
e. Describe and identify factors affecting the solution process, rates of reaction, and equilibrium. (DOK 2) • Concentration of a solution in terms of its molarity, using stoichiometry to perform specified dilutions	**Student Edition:** 458-461 *Chemistry Online* 463 *Example and Practice Problems* 462-463 *Supplemental Practice* 827 **Teacher Wraparound Edition:** CD 461; CO 463; ICE 462-463

STANDARDS	PAGE REFERENCES
• Chemical reaction rates affected by temperature, concentration, surface area, pressure, mixing, and the presence of a catalyst	**Student Edition:** 216-218, 220-221, 458-459, 710, 712-714 *Launch Lab* 703 *Mini Lab* 218 **Teacher Wraparound Edition:** CD 213, 217; CJ 459; D 216-217, 712-713; E 221; GT 216; QD 217, 220 459; VL 459, 710
• Relationship of solute character	**Student Edition:** 23, 450-454 *CHEMLAB* 456-457 *Figure 13.15* 451 *Figure 13.17* 453 **Teacher Wraparound Edition:** A 457; CD 453, 458; CIM 451; GT 453
• LeChatelier's Principle	**Student Edition:** 212-213 *CHEMISTRY AND TECHNOLOGY* 214-215 *Figure 6.16* 212 *Figure 6.17 & Figure 6.18* 213 *Section 6.3 Assessment* 221 #16 **Teacher Wraparound Edition:** D 212-213; UA 213
5. Compare factors associated with acid/base and oxidation/reduction reactions.	
a. Analyze and explain acid/base reactions. (DOK 2) • Properties of acids and bases, including how they affect indicators and the relative pH of the solution	**Student Edition:** 480-482, 501-503, 508 *Figure 14.20* 501 *Figure 14.24* 504 *Mini Lab* 482 **Teacher Wraparound Edition:** AC 492; D 502-503; GT 483, 503; IM 480; VL 503

STANDARDS	PAGE REFERENCES
• Formation of acidic and basic solutions	**Student Edition:** 483-484, 488-489, 492 *Chemistry Online* 492 *Figure 14.8* 486 *Figure 14.13* 492 **Teacher Wraparound Edition:** A 489; CB 484; CD 484; DI 484; GT 483; T 484; TPK 486; VL 516
• Definition of pH in terms of the hydronium ion concentration and the hydroxide ion concentration	**Student Edition:** 501-503 *Figure 14.20* 501 *Figure 14.22* 503 *Practice Problems* 502 *Section 14.2 Assessment* 508 **Teacher Wraparound Edition:** CB 501; D 502-503; DI 501; Di 500; ICE 502; R 500; T 501; VL 503
• The pH or pOH from the hydrogen ion or hydroxide ion concentrations of solution	**Student Edition:** 497-503 *CHEMLAB* 506-507 *Figure 14.20* 501 *Section 14.2 Assessment* 508 **Teacher Wraparound Edition:** CB 501; CD 497; CU 508; DI 501; Di 500; MI 497; R 500; T 501
• How a buffer works and examples of buffer solutions	**Student Edition:** 531-533 *Figure 15.13* 533 *Launch Lab* 515 *Mini Lab* 533 *Section 15.2 Assessment* 546 #19-20 **Teacher Wraparound Edition:** A 533; D 532-533; DD 514-515; Di 502; E 532; GT 531; IM 532; R 546

STANDARDS	PAGE REFERENCES
b. Classify species in aqueous solutions according to the Arrhenius and Bronsted-Lowry definitions, respectively and predict products for aqueous neutralization reactions. (DOK 2)	**Student Edition:** 483-484, 489, 516-518, 522-523, 526-529 *Example and Practice Problems* 521 *Figure 14.8* 486 **Teacher Wraparound Edition:** A 518; CB 526, 531; CD 486, 517; GT 522; IM 522; MI 516; R 489; VL 516
c. Analyze a reduction/oxidation reaction (REDOX) to assign oxidation numbers ▪ (states) to reaction species and identify the species oxidized and reduced, the oxidizing agent, and reducing agent. (DOK 2)	**Student Edition:** 556-559, 562 *Chemistry Online* 556 *Figure 16.3* 556 *Figure 16.4* 557 *Figure 16.8* 562 *Section 16.1 Assessment* 562 **Teacher Wraparound Edition:** CU 562; DI 556; E 562; GT 556; Re 562; T 556; TPK 562; VL 556