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Correlated to:

New York State Physical Setting/Chemistry Core Curriculum (Commencement Level)

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
Note: The use of "e.g." denotes examples which may be used for in-depth study. The terms "for example" and "such as" denote material which is testable. Items in parentheses denote further definition of the word(s) preceding the item and are testable.	
PROCESS SKILLS BASED ON STANDARDS 1, 2, 6, AND 7	
STANDARD 1—Analysis, Inquiry, and Design	
MATHEMATICAL ANALYSIS:	
Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.	
Key Idea 1: *Abstraction and symbolic representation are used to communicate mathematically.*	SE/TE: 81-87; Appendix: R56-R79 TE: Class Activity: 81, 84 TR: Guided Reading and Study Workbook: 3.3 LAB: Small-Scale Laboratory Manual: Lab 3, 4 TECH: Transparencies: T31-T37; Presentation Pro
M1.1 Use algebraic and geometric representations to describe and compare data.	SE/TE: 65, 81-87; Appendix: R56-R79 TE: Class Activity: 81, 84 TR: Guided Reading and Study Workbook: 3.3 LAB: Laboratory Manual: 37-44, 53-56, 57-62, 63-66, 79-84, 85-90, 121-126, 127-132, 139-146, 147-154, 155-162, 163-166, 203-210, 211-216, 231-236, 243-246, 311-318; Small-Scale Laboratory Manual: Lab 3, 4 TECH: Interactive Textbook with ChemASAP; Section Assessment: 3.3; Transparencies: T31-T37; Presentation Pro
• organize, graph, and analyze data gathered from laboratory activities or other sources	SE/TE: Inquiry Activity: 540, 798; Quick Labs: 45, 142, 226, 308, 428, 522; Small-Scale Labs: 56, 94, 120, 137, 179, 200, 245, 267, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809; Appendix: R74-R77 LAB: Laboratory Manual: 37-44, 53-56, 57-62, 63-66, 79-84, 85-90, 121-126, 127-132, 139-146, 147-154, 155-162, 163-166, 203-210, 211-216, 231-236, 243-246, 311-318; Small-Scale Laboratory Manual: Lab 3, 4

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
o identify independent and dependent variables	SE/TE: 22 TR: Guided Reading and Study Workbook: 1.3 TECH: Interactive Textbook with ChemASAP; Section Assessment: 1.3; Presentation Pro
o create appropriate axes with labels and scale	SE/TE: Inquiry Activity: 540, 798; Quick Lab: 428, 818; Small-Scale Lab: 809 LAB: Laboratory Manual: 37-44, 57-62, 63-66, 127-132, 139-146, 147-154, 155-162, 203-210, 231-236, 311-318
o identify graph points clearly	SE/TE: Inquiry Activity: 540, 798; Quick Lab: 428, 818; Small-Scale Lab: 809 LAB: Laboratory Manual: 37-44, 57-62, 63-66, 127-132, 139-146, 147-154, 155-162, 203-210, 231-236, 311-318
• measure and record experimental data and use data in calculations	SE/TE: Inquiry Activity: 62, 286, 384, 540, 798; Quick Lab: 23, 45, 72, 87, 108, 142, 175, 199, 226, 279, 308, 326, 372, 402, 428, 448, 489, 522, 544, 604, 653, 684, 707, 746, 780, 818; Small-Scale Lab: 56, 94, 120, 137, 179, 200, 245, 267, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: All 52 labs contained in the manual; Small-Scale Chemistry Lab Manual: All 41 labs contained in the manual; Probeware Laboratory Manual: All 7 labs contained in the manual
o choose appropriate measurement scales and use units in recording	SE/TE: 73-79 TE: Class Activity: 76; Teacher Demo: 75 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 37-44 TECH: Interactive Textbook with ChemASAP; Section Assessment: 3.2; Transparencies: T27-T30; www.SciLinks.org web code: cdn-1032 ; Presentation Pro
o show mathematical work, stating formula and steps for solution	SE/TE: 28-30 TR: Guided Reading and Study Workbook: 1.3 LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 127-132, 147-154, 163-166, 199-202, 203-210, 211-216, 217-224, 243-246, 259-266 TECH: Interactive Textbook with ChemASAP; Section Assessment: 1.3; Transparencies: T7-T8; Presentation Pro

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
o estimate answers	SE/TE: 29 TR: Guided Reading and Study Workbook: 1.3 TECH: Interactive Textbook with ChemASAP; Section Assessment: 1.3; Presentation Pro
o use appropriate equations and significant digits	SE/TE: 68-72; CHEMath: 362; Appendix: R59-R61; Inquiry Activity: 62 TE: Class Activity: 68, 72 TR: Guided Reading and Study Workbook: 3.1 LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 127-132, 147-154, 163-166, 199-202, 203-210, 211-216, 217-224, 243-246, 259-266 TECH: Interactive Textbook with ChemASAP; Section Assessment: 3.1; Animation: 3.2; Presentation Pro
o show uncertainty in measurement by the use of significant figures	SE/TE: 66-67 TE: Class Activity: 66 TR: Guided Reading and Study Workbook: 3.1 LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 127-132, 147-154, 163-166, 199-202, 203-210, 211-216, 217-224, 243-246, 259-266 TECH: Interactive Textbook with ChemASAP; Section Assessment: 3.1; Animation: 3.2; Presentation Pro
o identify relationships within variables from data tables.	SE/TE: Inquiry Activity: 154; Quick Lab: 175, 818; Small-Scale Lab: 94, 179, 774 LAB: Laboratory Manual: 37-44, 57-62, 63-66, 127-132, 139-146, 147-154, 155-162, 203-211, 231-236, 311-318
o calculate percent error	SE/TE: 64-65; Quick Lab: 72; Small-Scale Lab: 120, 367 TR: Guided Reading and Study Workbook: 3.1 LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 163-166, 211-216, 243-246 TECH: Interactive Textbook with ChemASAP: Assessment: 3.1; Presentation Pro

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
• recognize and convert various scales of measurement	SE/TE: 73-79, 80-87; Appendix: R46, R66-R68 TR: Guided Reading and Study Workbook: 3.2, 3.3 LAB: Laboratory Manual: TECH: Interactive Textbook with ChemASAP: Assessment: 3.2, 3.3; Animation: 3.3; Transparencies: T27-T30; www.SciLinks.org web code: cdn-1032; Presentation Pro
o **temperature**	SE/TE: 77-78; Appendix: R46; Quick Lab: 522 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 33-36, 79-84, 139-146, 155-162, 167-172, 189-194, 203-210, 211-216, 217-224, 225-230, 231-236, 299-304 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; www.SciLinks.org web code: cdn-1032; Presentation Pro
• Celsius (°C)	SE/TE: 77-78; Appendix: R46; Quick Lab: 522 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 33-36, 79-84, 139-146, 155-162, 167-172, 189-194, 203-210, 211-216, 217-224, 225-230, 231-236, 299-304 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; www.SciLinks.org web code: cdn-1032; Presentation Pro
• Kelvin (K)	SE/TE: 77-78; Appendix: R46; Quick Lab: 522 TR: Guided Reading and Study Workbook: 3.2 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; www.SciLinks.org web code: cdn-1032; Presentation Pro
o **length**	SE/TE: 74; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 53-56, 127-132, 147-153, 155-162, 163-166, 311-317 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
• kilometers (km)	SE/TE: 74; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
• meters (m)	SE/TE: 74; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
• centimeters (cm)	SE/TE: 74; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 53-56, 127-132, 147-153, 155-162, 163-166, 311-317 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
• millimeters (mm)	SE/TE: 74; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 53-56, 127-132, 147-153, 155-162, 163-166, 311-317 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
o **mass**	SE/TE: 76; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 63-66, 79-84, 85-90, 121-126, 203-210, 211-216, 217-224, 225-230, 243-246, 259-266 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
• grams (g)	SE/TE: 76; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 LAB: Laboratory Manual: 63-66, 79-84, 85-90, 121-126, 203-210, 211-216, 217-224, 225-230, 243-246, 259-266 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro
• kilograms (kg)	SE/TE: 76; Appendix: R46 TR: Guided Reading and Study Workbook: 3.2 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Presentation Pro

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
o **pressure**	SE/TE: 386-388; Appendix: R46 TR: Guided Reading and Study Workbook: 13.1 LAB: Laboratory Manual: 147-153 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; Presentation Pro
• kilopascal (kPa)	SE/TE: 386-388; Appendix: R46 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; Presentation Pro
• atmosphere (atm)	SE/TE: 386-388; Appendix: R46 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; Presentation Pro
• use knowledge of geometric arrangements to predict particle properties or behavior	SE/TE: 232-233, 240 TR: Guided Reading and Study Workbook: 8.3 LAB: Laboratory Manual: 77 TECH: Interactive Textbook with ChemASAP: Assessment: 8.3; Presentation Pro
Key Idea 2: *Deductive and inductive reasoning are used to reach mathematical conclusions.*	SE/TE: 28-32 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
M2.1 Use deductive reasoning to construct and evaluate conjectures and arguments, recognizing that patterns and relationships in mathematics assist them in arriving at these conjectures and arguments.	SE/TE: 31-32 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
• interpret a graph constructed from experimentally obtained data	SE/TE: Interpreting Graphs: 16, 171, 174, 388, 394, 403, 418, 420, 429, 474, 523, 543, 547, 550, 576, 578, 602, 606, 618, 803, 804; Appendix: R74-R77
o identify relationships	SE/TE: 418-422; Quick Lab: 818; Appendix: R74-R77
• direct	SE/TE: 420-422; Appendix: R74-R75

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• inverse	SE/TE: 418-419; Quick Lab: 818; Appendix: R74-R75
o apply data showing trends to predict information	SE/TE: Interpreting Graphs: 171, 174, 394, 418, 420; Appendix: R75-R77
Key Idea 3: *Critical thinking skills are used in the solution of mathematical problems.*	SE/TE: 28-32 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
M3.1 Apply algebraic and geometric concepts and skills to the solution of problems.	SE/TE: 28-32 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
• state assumptions which apply to the use of a particular mathematical equation and evaluate these assumptions to see if they have been met	SE/TE: 28-32 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
• evaluate the appropriateness of an answer, based on given data	SE/TE: 29-30 TE: Teacher Demo: 31 TR: Guided Reading and Study Workbook: 1.4 TECH: Interactive Textbook with ChemASAP: Assessment: 1.4; Presentation Pro
SCIENTIFIC INQUIRY:	
Key Idea 1: *The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.*	SE/TE: 9
S1.1 Elaborate on basic scientific and personal explanations of natural phenomena, and develop extended visual models and mathematical formulations to represent thinking.	SE/TE: 100-102, 107-108, 127-132, 138-145, 230-236, 385-386, 390-391, 396, 418-425, 426-429, 432-436, 588-593; Inquiry Activity: 100 TE: Class Activity: 130, 145, 232, 419, 422, 433

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
(Continued) S1.1 Elaborate on basic scientific and personal explanations of natural phenomena, and develop extended visual models and mathematical formulations to represent thinking.	(Continued) TR: Guided Reading and Study Workbook: 4.1, 4.2, 5.1, 5.3, 8.3, 13.1, 13.2, 13.3, 14.2, 14.3, 14.4, 19.1 LAB: Laboratory Manual: 45-48, 147-154; Laboratory Practical: 8-1, 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 4.25.1, 5.3, 8.3, 13.1, 13.2, 13.3, 14.2, 14.3, 14.4, 19.1; Transparencies: T43-T44, T139-T141, T152-T155, T156-T157, T158-T159, T213-T214; www.SciLinks.org web code: cdn-1131, cdn-1142, cdn-1144; Presentation Pro
• use theories and/or models to represent and explain observations	SE/TE: 100-102, 107-108, 127-132, 230-236, 385-389, 390-391, 396, 418-425, 426-427, 432-436, 588-593 TE: Class Activity: 130, 145, 419, 422, 433; Teacher Demo: 386 TR: Guided Reading and Study Workbook: 4.1, 4.2, 5.3, 8.3, 13.1, 13.2, 13.2, 14.2, 14.3, 14.4, 19.1 LAB: Laboratory Manual: 45-48, 73-78, 147-154; Lab Practical: 8-1, 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 4.2, 5.3, 8.3, 13.1, 13.2, 13.2, 14.2, 14.3, 14.4, 19.1; Transparencies: T139-T141, T152-T155, T158-T159; www.SciLinks.org web code: cdn-1131, cdn-1142, cdn-1144; Presentation Pro
• use theories and/or principles to make predictions about natural phenomena	SE/TE: 100-102, 230-236, 418-425, 426-427, 432-436, 588-593 TE: Class Activity: 419, 422 TR: Guided Reading and Study Workbook: 4.1, 8.3, 13.1, 14.2, 14.3, 14.4, 19.1 LAB: Laboratory Manual: 147-154; Lab Practical: 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 8.3, 13.1, 14.2, 14.3, 14.4, 19.1; Transparencies: T139-T141, T152-T155, T158-T159; www.SciLinks.org web code: cdn-1131, cdn-1142, cdn-1144; Presentation Pro

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
• develop models to explain observations	SE/TE: 107-108, 127-132, 142-145, 230-236 TE: Class Activity: 139, 145, 433 TR: Guided Reading and Study Workbook: 4.2, 5.1, 5.3, 8.3 LAB: Laboratory Manual: 45-48 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2, 5.1, 5.3, 8.3; Animation 4.4; www.SciLinks.org web code: cdn-1042; Presentation Pro
S1.2 Hone ideas through reasoning, library research, and discussion with others, including experts.	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819
• locate data from published sources to support/defend/explain patterns observed in natural phenomena	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819
S1.3 Work towards reconciling competing explanations, clarifying points of agreement and disagreement.	SE/TE: 21, 24-25 TE: Class Activity: 24 TR: Guided Reading and Study Workbook: 1.3 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; Presentation Pro
• evaluate the merits of various scientific theories and indicate why one theory was accepted over another	SE/TE: 21, 101-102, 104-108, 127-130 TR: Guided Reading and Study Workbook: 1.3, 4.1, 4.2, 5.1 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3, 4.1, 4.2, 5.1; Presentation Pro
Key Idea 2: *Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.*	SE/TE: 21-23 TR: Guided Reading and Study Workbook: 1.3 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; Presentation Pro
S2.1 Devise ways of making observations to test proposed explanations.	SE/TE: 22-23; Small-Scale Lab: 56, 94, 120 , 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 TR: Guided Reading and Study Workbook: 1.3 LAB: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309

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(Continued) S2.1 Devise ways of making observations to test proposed explanations.	(Continued) TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; www.SciLinks.org web code: cdn-1012; Presentation Pro
• design and/or carry out experiments, using scientific methodology to test proposed calculations	SE/TE: 22-23; Small-Scale Lab: 56, 94, 120 , 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 TR: Guided Reading and Study Workbook: 1.3 LAB: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; www.SciLinks.org web code: cdn-1012; Presentation Pro
S2.2 Refine research ideas through library investigations, including information retrieval and reviews of the literature, and through peer feedback obtained from review and discussion.	SE/TE: Writing Activities: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Laboratory Manual: 52, 56, 66, 71, 138, 145, 177, 182, 202, 250, 297, 317
• use library investigations, retrieved information, and literature reviews to improve the experimental design of an experiment	LAB: Laboratory Manual: 44, 56, 177
S2.3 Develop and present proposals including formal hypotheses to test explanations, i.e.; they predict what should be observed under specific conditions if their explanation is true.	SE/TE: 22 TR: Guided Reading and Study Workbook: 1.3 LAB: Laboratory Manual: 32, 36, 44, 47, 62, 66, 77, 84, 90, 96, 100, 108, 114, 126, 132, 145, 152, 161, 166, 172, 176, 187, 193, 198, 202, 209, 216, 223, 230, 235, 241, 246, 250, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309, 317 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; Presentation Pro
• develop research proposals in the form of "if X is true and a particular test Y is done, then prediction Z will occur"	SE/TE: 22 TR: Guided Reading and Study Workbook: 1.3

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(Continued) • develop research proposals in the form of "if X is true and a particular test Y is done, then prediction Z will occur"	(Continued) LAB: Laboratory Manual: 32, 36, 44, 47, 62, 66, 77, 84, 90, 96, 100, 108, 114, 126, 132, 145, 152, 161, 166, 172, 176, 187, 193, 198, 202, 209, 216, 223, 230, 235, 241, 246, 250, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309, 317 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3; Presentation Pro
S2.4 Carry out a research plan for testing explanations, including selecting and developing techniques, acquiring and building apparatus, and recording observations as necessary.	SE/TE: Small-Scale Lab: 56, 94, 120 , 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 32, 36, 44, 47, 62, 66, 77, 84, 90, 96, 100, 108, 114, 126, 132, 145, 152, 161, 166, 172, 176, 187, 193, 198, 202, 209, 216, 223, 230, 235, 241, 246, 250, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309, 317; Small-Scale Lab Manual: Lab 3, 4, 7
• determine safety procedures to accompany a research plan	SE/TE: Appendix: R90-R91; Small-Scale Lab: 26-27 LAB: Laboratory Manual: 5-9
Key Idea 3: *The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.*	SE/TE: 22
S3.1 Use various means of representing and organizing observations (e.g., diagrams, tables, charts, graphs, equations, and matrices) and insightfully interpret the organized data.	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 179, 200, 245, 267, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809; Interpreting Graphs: 16, 171, 174, 388, 394, 403, 418, 420, 429, 474, 523, 543, 547, 550, 576, 578, 602, 606, 618, 803, 804 LAB: Laboratory Manual: 319-321, All 52 Labs contained in the manual; Small-Scale Lab Manual: All 41 labs; Probeware Lab Manual: All 7 labs
• organize observations in a data table, analyze the data for trends or patterns, and interpret the trends or patterns, using scientific concepts	SE/TE: Inquiry Activity: 798; Small-Scale Lab: 179, 617, 809 LAB: 37-44, 57-62, 63-66, 127-132, 139-146, 147-154, 155-162, 203-211, 231-236, 311-318

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S3.2 Apply statistical analysis techniques when appropriate to test if chance alone explains the result.	
S3.3 Assess correspondence between the predicted result contained in the hypothesis and the actual result, and reach a conclusion as to whether or not the explanation on which the prediction is supported.	SE/TE: 22 TR: Guided Reading and Study Workbook: 1.3 LAB: Laboratory Manual: 32, 36, 44, 45-48, 62, 77, 84, 90, 96, 100, 108, 114-115, 126, 132, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3
• evaluate experimental methodology for inherent sources of error and analyze the possible effect on the result	LAB: Laboratory Manual: 37-44, 53-56, 63-66, 85-90, 121-126, 127-132, 155-162, 211-216, 243-246
• compare the experimental result to the expected result; calculate the percent error as appropriate	SE/TE: 65; Quick Lab: 72; Small-Scale Lab: 120, 367 TR: Guided Reading and Study Workbook: 3.1 LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 163-166, 211-216, 243-246
S3.4 Using results of the test and through public discussion, revise the explanation and contemplate additional research.	SE/TE: 21-23 TR: Guided Reading and Study Workbook: 1.3 LAB: Laboratory Manual: 52, 56, 66, 71, 138, 145, 177, 182, 202, 250, 297, 317 TECH: Interactive Textbook with ChemASAP: Assessment: 1.3
S3.5 Develop a written report for public scrutiny that describes the proposed explanation, including a literature review, the research carried out, its results, and suggestions for further research.	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Laboratory Manual: 52, 56, 66, 71, 138, 145, 177, 182, 202, 250, 297, 317

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ENGINEERING DESIGN	
Key Idea 1: *Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints.*	SE/TE: Small-Scale Lab: 137; Technology & Society: 88, 204-205, 259, 478-479 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309 Small-Scale Lab Manual: Lab 3, 4, 7
If students are asked to do a design project, then:	
• Initiate and carry out a thorough investigation of an unfamiliar situation and identify needs and opportunities for technological invention or innovation.	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309; Small-Scale Lab Manual: Lab 3, 4, 7
• Identify, locate, and use a wide range of information resources, and document through notes and sketches how findings relate to the problem.	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309; Small-Scale Lab Manual: Lab 3, 4, 7
• Generate creative solutions, break ideas into significant functional elements, and explore possible refinements; predict possible outcomes, using mathematical and functional modeling techniques; choose the optimal solution to the problem, clearly documenting ideas against design criteria and constraints; and explain how human understandings, economics, ergonomics, and environmental considerations have influenced the solution.	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309; Small-Scale Lab Manual: Lab 3, 4, 7

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• Develop work schedules and working plans which include optimal use and cost of materials, processes, time, and expertise; construct a model of the solution, incorporating developmental modifications while working to a high degree of quality (craftsmanship).	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309; Small-Scale Lab Manual: Lab 3, 4, 7
• Devise a test of the solution according to the design criteria and perform the test; record, portray, and logically evaluate performance test results through quantitative, graphic, and verbal means. Use a variety of creative verbal and graphic techniques effectively and persuasively to present conclusions, predict impact and new problems, and suggest and pursue modifications.	SE/TE: Small-Scale Lab: 56, 94, 120, 137, 200, 245, 304, 345, 367, 400, 437, 458, 497, 533, 574, 617, 655, 684, 708, 753, 774, 809 LAB: Laboratory Manual: 24, 32, 36, 44, 48, 62, 77, 84, 90, 96, 100, 108, 115, 120, 126, 132, 138, 152, 161, 166, 172, 187, 193, 198, 209, 216, 223, 230, 235, 241, 246, 254, 258, 266, 270, 274, 278, 286, 290, 303, 309; Small-Scale Lab Manual: Lab 3, 4, 7
STANDARD 2—Information Systems	
Students will access, generate, process, and transfer information using appropriate technologies.	SE/TE: 25 LAB: Probeware Lab Manual: All 7 labs.
Key Idea 1: *Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.*	SE/TE: 25 TE: Class Activity: 24 TECH: Interactive Textbook with ChemASAP: Assessment: all; Animation: 2.1, 3.2, 3.3, 4.4, 5.15, 5.16, 6.5, 7.18, 10.6, 11.7, 12.8, 13.9, 13.10, 13.11, 14.13, 14.14, 14.20, 14.21, 17.12, 18.23, 18.24, 19.25, 19.26, 22.28, 24.29, 25.30; Simulation: 3.1, 5.12, 5.13, 8.16, 8.17, 8.18, 9.2, 10.3, 11.4, 12.6, 14.9, 14.10, 14.11, 15.19, 15.20, 16.22, 17.8, 18.23, 18.24, 18.25, 19.26, 21.27, 24.29, 25.30; www.SciLinks.org web code: cdn-1011, cdn-1012, cdn-1021, cdn-1023, cdn-1024, cdn-1032, cdn-1034, cdn-1042, cdn-1042, cdn-1043, cdn-1052, cdn-1061, cdn-1062, cdn-1063, cdn-1072, cdn-1081, cdn-1082, cdn-1083, cdn-1084, cdn-1 cdn-1103, cdn-1104, cdn-1111, cdn-1112, cdn-1114, cdn-1121, cdn-1123, cdn-1131, 085, cdn-1092, cdn-1093, cdn-1101

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(Continued) ***Key Idea 1:*** *Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.*	(Continued) cdn-1133, cdn-1134, cdn-1141, cdn-1142, cdn-1144, cdn-1152, cdn-1153, cdn-1161, cdn-1163, cdn-1171, cdn-1172, cdn-1174, cdn-1181, cdn-1182, cdn-1184, cdn-1191, cdn-1192, cdn-1201, cdn-1202, cdn-1203, cdn-1211, cdn-1213, cdn-1221, cdn-1224, cdn-1225, cdn-1231, cdn-1232, cdn-1233, cdn-1234, cdn-1241, cdn-1242, cdn-1243, cdn-1244, cdn-1245, cdn-1246, cdn-1252, cdn-1254; www.phschool.com web code: cdb-1034, cdb-1043, cdb-1053, cdb-1091, cdb-1111, cdb-1203, cdb-1143, cdb-1152, cdb-1172, cdb-1185, cdb-1193, cdb-1221
Examples include:	
• use the Internet as a source to retrieve information for classroom use, e.g., Periodic Table, acid rain	SE/TE: 25 TE: Class Activity: 24 TECH: Interactive Textbook with ChemASAP: Assessment: all; Animation: 2.1, 3.2, 3.3, 4.4, 5.15, 5.16, 6.5, 7.18, 10.6, 11.7, 12.8, 13.9, 13.10, 13.11, 14.13, 14.14, 14.20, 14.21, 17.12, 18.23, 18.24, 19.25, 19.26, 22.28, 24.29, 25.30; Simulation: 3.1, 5.12, 5.13, 8.16, 8.17, 8.18, 9.2, 10.3, 11.4, 12.6, 14.9, 14.10, 14.11, 15.19, 15.20, 16.22, 17.8, 18.23, 18.24, 18.25, 19.26, 21.27, 24.29, 25.30; www.SciLinks.org web code: cdn-1011, cdn-1012, cdn-1021, cdn-1023, cdn-1024, cdn-1032, cdn-1034, cdn-1042, cdn-1042, cdn-1043, cdn-1052, cdn-1061, cdn-1062, cdn-1063, cdn-1072, cdn-1081, cdn-1082, cdn-1083, cdn-1084, cdn-1085, cdn-1092, cdn-1093, cdn-1101, cdn-1103, cdn-1104, cdn-1111, cdn-1112, cdn-1114, cdn-1121, cdn-1123, cdn-1131, cdn-1133, cdn-1134, cdn-1141, cdn-1142, cdn-1144, cdn-1152, cdn-1153, cdn-1161, cdn-1163, cdn-1171, cdn-1172, cdn-1174, cdn-1181, cdn-1182, cdn-1184, cdn-1191, cdn-1192, cdn-1201, cdn-1202, cdn-1203, cdn-1211, cdn-1213, cdn-1221 TECH: www.SciLinks.org web code: cdn-1224, cdn-1225, cdn-1231, cdn-1232, cdn-1233, cdn-1234, cdn-1241, cdn-1242, cdn-1243, cdn-1244, cdn-1245, cdn-1246, cdn-1252, cdn-1254; www.phschool.com web code: cdb-1034, cdb-1043, cdb-1053, cdb-1091, cdb-1111, cdb-1203, cdb-1143, cdb-1152, cdb-1172, cdb-1185, cdb-1193, cdb-1221

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Key Idea 2: *Knowledge of the impacts and limitations of information systems is essential to its effectiveness and ethical use.*	SE/TE: 25
Examples include:	
• critically assess the value of information with or without benefit of scientific backing and supporting data, and evaluate the effect such information could have on public judgment or opinion, e.g., environmental issues	SE/TE: 10-11
• discuss the use of the peer-review process in the scientific community and explain its value in maintaining the integrity of scientific publication, e.g., "cold fusion"	SE/TE: 23-25
STANDARD 6—Interconnectedness: Common Themes	
Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.	SE/TE: 12-17; Technology & Society: 18-19, 43, 88, 109, 147, 168-169, 204-205, 242, 259, 313, 340-341, 376-377, 405, 430-431, 463, 478-479, 518-519, 548, 623, 644, 685, 716-717, 754-755, 791, 814-815; ChemMath: 80, 83, 117, 140, 362, 387, 599; Appendix C: Math Handbook: R56-RR79
SYSTEMS THINKING:	
Key Idea 1: *Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.*	SE/TE: 506-507
Examples include:	
• use the concept of systems and surroundings to describe heat flow in a chemical or physical change, e.g., dissolving process	SE/TE: 451, 506-507, 511-512, 525 TE: Class Activity: 508; Teacher Demo: 515 TR: Guided Reading and Study Workbook: 15.2, 17.1, 17.2, 17.3 TECH: Interactive Textbook with ChemASAP: Assessment: 15.2, 17.1, 17.2, 17.3; Simulation 15.19; Presentation Pro

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MODELS:	
Key Idea 2: *Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.*	SE/TE: 88
2.1 Revise a model to create a more complete or improved representation of the system.	SE/TE: 101-102, 127-130, 155-157 TE: Class Activity: 106 TR: Guided Reading and Study Workbook: 4.1, 5.1, 6.1 LAB: Lab Practical: 5-1 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 5.1, 6.1; Presentation Pro
• show how models are revised in response to experimental evidence, e.g., atomic theory, Periodic Table	SE/TE: 101-102, 104-108, 127-130, 155-157; Quick Lab: 108 TE: Class Activity: 106; Teacher Demo: 105 TR: Guided Reading and Study Workbook: 4.1, 4.2, 5.1, 6.1 LAB: Laboratory Manual: 45-48; Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 4.2, 5.1, 6.1; Animation: 4.4; Transparencies: T43-T44, T45-T47; www.SciLinks.org web code: cdn-1042; Presentation Pro
2.2 Collect information about the behavior of a system and use modeling tools to represent the operation of the system.	SE/TE: 385-386, 390-391, 396, 414-417, 418-423 TE: Class Activity: 419, 422 TR: Guided Reading and Study Workbook: 13.1, 13.2, 13.3, 14.1, 14.2 LAB: Laboratory Manual: 147-154, 155-162; Lab Practical: 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 13.2, 13.3, 14.1, 14.2; Simulation: 14.9, 14.10, 14.11; Presentation Pro
• show how information about a system is used to create a model, e.g., kinetic molecular theory (KMT)	SE/TE: 385-386, 390-391, 396, 414-417, 418-423 TE: Class Activity: 419, 422 TR: Guided Reading and Study Workbook: 13.1, 13.2, 13.3, 14.1, 14.2 LAB: Laboratory Manual: 147-154, 155-162; Lab Practical: 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 13.2, 13.3, 14.1, 14.2; Animation: 13.9; www.SciLinks.org web code: cdn-1131, cdn-1141; Presentation Pro

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2.3 Find and use mathematical models that behave in the same manner as the processes under investigation.	SE/TE: 90-92, 418-425, 426-429, 432-436, 491-496, 508-510, 512-513; Inquiry Activity: 412; Quick Lab: 428; Small-Scale Lab: 437 TE: Class Activity: 419, 422, 433, 435, 512 TR: Guided Reading and Study Workbook: 3.4, 14.2, 14.3, 14.4, 16.4, 17.1, 17.2 LAB: Laboratory Manual: 147-154, 155-162, 163-166, 203-210, 211-216; Lab Practical: 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 14.13, 14.14; Simulation: 14.9, 14.10, 14.11, 16.22; Transparencies: T152-T155, T158-T159; www.SciLinks.org web code: cdn-1034, cdn-1142, cdn-1144; Presentation Pro
• show how mathematical models (equations) describe a process, e.g., combined gas law	SE/TE: 90-92, 418-425, 426-429, 432-436, 491-496, 508-510, 512-513; Inquiry Activity: 412; Quick Lab: 428 TE: Class Activity: 419, 422, 433, 435, 512 TR: Guided Reading and Study Workbook: 3.4, 14.2, 14.3, 14.4, 16.4, 17.1, 17.2 LAB: Laboratory Manual: 147-154, 155-162, 163-166, 203-210, 211-216; Lab Practical: 14-1, 14-2 TECH: Interactive Textbook with ChemASAP: Assessment: 14.13, 14.14; Simulation: 14.9, 14.10, 14.11, 16.22; Transparencies: T152-T155, T158-T159; www.SciLinks.org web code: cdn-1034, cdn-1142, cdn-1144; Presentation Pro
2.4 Compare predictions to actual observations, using test models.	SE/TE: 428-429; Quick Lab: 428 TE: Class Activity: 419, 422, 433, 435 TR: Guided Reading and Study Workbook: 14.3 LAB: Laboratory Manual: 147-154, 155-162, 163-166, 203-210, 211-216 TECH: Interactive Textbook with ChemASAP: Assessment: 14.3; Simulation: 14.9, 14.10, 14.11, 16.22; www.SciLinks.org web code: cdn-1142, cdn-1144
• compare experimental results to a predicted value, e.g., percent error	SE/TE: 65; Quick Lab: 72; Small-Scale Lab: 120, 367 TR: Guided Reading and Study Workbook: 3.1

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(Continued) • compare experimental results to a predicted value, e.g., percent error	(Continued) LAB: Laboratory Manual: 37-44, 53-56, 63-66, 79-84, 85-90, 121-126, 163-166, 211-216, 243-246 TECH: Interactive Textbook with ChemASAP: Assessment: 3.1
MAGNITUDE AND SCALE:	
Key Idea 3: *The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.*	SE/TE: 73-74 TR: Guided Reading and Study Workbook: 3.1 TECH: Interactive Textbook with ChemASAP: Assessment: 3.1; Transparencies: T20
3.1 Describe the effects of changes in scale on the functioning of physical, biological, or designed information systems.	SE/TE: 88
• show how microscale processes can resemble or differ from real-world processes, e.g., microscale chemistry	TE: 26-27
3.2 Extend the use of powers of ten notation to understanding the exponential function and performing operations with exponential factors.	SE/TE: 63, 595-601; Appendix: R56-R58
• use powers often to represent a large range of values for a physical quantity, e.g., pH scale	SE/TE: 595-601 TR: Guided Reading and Study Workbook: 19.2 TECH: Interactive Textbook with ChemASAP: Assessment: 19.2; www.SciLinks.org web code: cdn-1192
EQUILIBRIUM AND STABILITY	
Key Idea 4: *Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).*	SE/TE: 392, 550-551 TR: Guided Reading and Study Workbook: 18.2 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2

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4.1 Describe specific instances of how disturbances might affect a system's equilibrium, from small disturbances that do not upset the equilibrium to larger disturbances (threshold level) that cause the system to become unstable.	SE/TE: 543-544, 552-555 TR: Guided Reading and Study Workbook: 18.1, 18.2 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1, 18.2
• explain how a small change might not affect a system, e.g., activation energy	SE/TE: 543-544 TR: Guided Reading and Study Workbook: 18.1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1
4.2 Cite specific examples of how dynamic equilibrium is achieved by equality of change in opposing directions.	SE/TE: 392, 550-551 TR: Guided Reading and Study Workbook: 18.2 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2
• explain how a system returns to equilibrium in response to a stress, e.g., LeChatelier's principle	SE/TE: 552-555, 563-564 TE: Teacher Demo: 555 TR: Guided Reading and Study Workbook: 18.2, 18.3 LAB: Laboratory Manual: 237-242; Small-Scale Lab Manual: Lab 29 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2, 18.3; Simulation 18.23, 18.24; www.SciLinks.org web code: cdn-1182
PATTERNS OF CHANGE:	
Key Idea 5: *Identifying patterns of change is necessary for making predictions about future behavior and conditions.*	SE/TE: Interpreting Graphs: 16, 171, 174, 388, 294, 403, 418, 420, 429, 474, 523, 543, 547, 55-, 576, 578, 602, 606, 618, 803, 804
Examples include:	
• use graphs to make predictions, e.g., half-life, solubility	SE/TE: Interpreting Graphs: 171, 174, 394, 418, 420, 804, 809 LAB: Laboratory Manual: 57-62, 63-66

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• use graphs to identify patterns and interpret experimental data, e.g., heating and cooling curves	SE/TE: Interpreting Graphs: 16, 171, 174, 388, 294, 403, 418, 420, 429, 474, 523, 543, 547, 55-, 576, 578, 602, 606, 618, 803, 804 LAB: Laboratory Manual: 57-62, 127-132, 139-146, 147-154, 155-162, 203-210, 231-236
STANDARD 7—Interdisciplinary Problem Solving	
CONNECTIONS:	
Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.	
Key Idea 1: *The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/ technology/society, consumer decision making, design, and inquiry into phenomena.*	SE/TE: 11
1.1 Analyze science/technology/society problems and issues on a community, national, or global scale and plan and carry out a remedial course of action.	SE/TE: 11; Writing Activity: 579, 736; Element Handbook: 436; Appendix: R16, R22, R27, R31, R44
• carry out a remedial course of action by communicating the plan to others, e.g., writing and sending "a letter to the editor"	
1.2 Analyze and quantify consumer product data, understand environmental and economic impacts, develop a method for judging the value and efficacy of competing products, and discuss cost-benefit and risk-benefit trade-offs made in arriving at the optimal choice.	SE/TE: 11; Writing Activity: 273, 366 TE: 620 LAB: Small-Scale Lab Manual: Lab 19, 38, 39
• compare and analyze specific consumer products, e.g., antacids, vitamin C	SE/TE: 11; Writing Activity: 273, 366 TE: 620 LAB: Small-Scale Lab Manual: Lab 19, 38, 39

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1.3 Design solutions to real-world problems on a community, national, or global scale, using a technological design process that integrates scientific investigation and rigorous mathematical analysis of the problem and of the solution.	SE/TE: Elements Handbook: 436
• design a potential solution to a regional problem, e.g., suggest a plan to adjust the acidity of a lake in the Adirondacks	
1.4 Explain and evaluate phenomena mathematically and scientifically by formulating a testable hypothesis, demonstrating the logical connections between the scientific concepts guiding the hypothesis and the design of an experiment, applying and inquiring into the mathematical ideas relating to investigation of phenomena, and using (and if needed, designing) technological tools and procedures to assist in the investigation and in the communication of results.	SE/TE: Quick Lab: 72, 308, 428, 522; Small-Scale Lab: 94, 304, 367, 497, 617, 774, 809 LAB: Laboratory Manual: 44, 84, 90, 126, 132, 152, 166, 209, 216, 223, 246, 266
• design an experiment that requires the use of a mathematical concept to solve a scientific problem, e.g., an experiment to compare the density of different types of soda pop	SE/TE: Small-Scale Lab: 94, 304, 367, 497, 617, 774, 809 LAB: Laboratory Manual: 44, 84, 90, 126, 132, 152, 166, 209, 216, 223, 246, 266
STRATEGIES:	
Key Idea 2: *Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.*	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7

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If students are asked to do a project, then the project would require students to:	
• work effectively	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
• gather and process information	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
• generate and analyze ideas	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
• observe common themes	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
• realize ideas	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
• present results	SE/TE: Writing Activity: 236, 258, 273, 296, 477, 579, 593, 638, 711, 736, 808, 819 LAB: Small-Scale Lab: Lab 3, 4, 7
PROCESS SKILLS BASED ON STANDARD 4	
STANDARD 4—The Physical Setting	
Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.	
Key Idea 3: *Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.*	SE/TE: 39-42, 48-51, 53-55, 158-160, 164-167, 196-199, 201-202, 214, 237-244; Inquiry Activity: 154; Appendix: R6-R45 TE: Teacher Demo: 165, 240, 243 TR: Guided Reading and Study Workbook: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4 LAB: Laboratory Manual: 63-66 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4; www.SciLinks.org web code: cdn-1021, cdn-1061, cdn-1062

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3.1 Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them.	SE/TE: 39-42, 48-51, 53-55, 158-160, 164-167, 196-199, 201-202, 214, 237-244; Inquiry Activity: 154; Appendix: R6-R45 TE: Teacher Demo: 165, 240, 243 TR: Guided Reading and Study Workbook: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4 LAB: Laboratory Manual: 63-66 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4; www.SciLinks.org web code: cdn-1021, cdn-1061, cdn-1062
i. use models to describe the structure of an atom (3.1b, 3.1c)	SE/TE: 101-102, 107-108, 127-130 TE: Class Activity: 106, 130 TR: Guided Reading and Study Workbook: 4.1, 4.2 LAB: Laboratory Manual: 45-48; Lab Practical: 5-1 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 4.2; www.SciLinks.org web code: cdn-1042
ii. relate experimental evidence (given in the introduction of Key Idea 3) to models of the atom (3.1a)	SE/TE: 104-108, 130 TE: Teacher Demo: 105 TR: Guided Reading and Study Workbook: 4.1, 5.1 LAB: Laboratory Manual: 45-48 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 5.1; Animation: 4.4; www.SciLinks.org web code: cdn-1042
iii. determine the number of protons or electrons in an atom or ion when given one of these values (3.1e)	SE/TE: 110-113 TR: Guided Reading and Study Workbook: 4.3 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3; Transparencies: T48-T50
iv. calculate the mass of an atom, the number of neutrons or the number of protons, given the other two values (3.1f)	SE/TE: 111-113; Small-Scale Lab: 120 TR: Guided Reading and Study Workbook: 4.3 LAB: Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
v. distinguish between ground state and excited state electron configurations, e.g., 2-8-2 vs. 2-7-3 (3.1j)	SE/TE: 142-143 TR: Guided Reading and Study Workbook: 5.3 TECH: Interactive Textbook with ChemASAP: Assessment: 5.3
vi. vi identify an element by comparing its bright-line spectrum to given spectra (3.1k)	SE/TE: 141-143 TR: Guided Reading and Study Workbook: 5.3 LAB: Laboratory Manual: 52; Small-Scale Lab Manual: Lab 7, 8 TECH: Interactive Textbook with ChemASAP: Assessment: 5.3; Animation 5.16
vii. distinguish between valence and non-valence electrons, given an electron configuration, e.g., 2-8-2 (3.1l)	SE/TE: 187-192 TE: Teacher Demo: 188 TR: Guided Reading and Study Workbook: 7.1 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1; Transparencies: T75-T78; www.SciLinks.org web code: cdn-1082
viii. draw a Lewis electron-dot structure of an atom (3.1l)	SE/TE: 188-192, 218-219, 221-225, 227-229 TE: Class Activity: 190, 218, 220 TR: Guided Reading and Study Workbook: 7.1, 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1, 8.2; Transparencies: T87-T89; www.SciLinks.org web code: cdn-1082
ix. determine decay mode and write nuclear equations showing alpha and beta decay (3.1p, 4.4b)	SE/TE: 800-802 TR: Guided Reading and Study Workbook: 25.1 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1; Simulation 25.30; Transparencies: T287-T288
x. interpret and write isotopic notation (3.1g)	SE/TE: 111-113; Small-Scale Lab: 120 TR: Guided Reading and Study Workbook: 4.3 LAB: Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
xi. given an atomic mass, determine the most abundant isotope (3.1n)	SE/TE: 114-117 TR: Guided Reading and Study Workbook: 4.3 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3
xii. calculate the atomic mass of an element, given the masses and ratios of naturally occurring isotopes (3.1n)	SE/TE: 114-117; Small-Scale Lab: 120 TR: Guided Reading and Study Workbook: 4.3 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3
xiii. classify elements as metals, nonmetals, metalloids, or noble gases by their properties (3.1v, 3.1w, 3.1x, 3.1y)	SE/TE: 158-160, 164 TR: Guided Reading and Study Workbook: 6.1 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1; www.SciLinks.org web code: cdn-1061
xiv. compare and contrast properties of elements within a group or a period for Groups 1, 2, 13-18 on the Periodic Table (3.1aa, 3.1bb)	SE/TE: 161, 164-167; Appendix: R6-R37 TE: Teacher Demo: 165 TR: Guided Reading and Study Workbook: 6.2 LAB: Laboratory Manual: 63-66; Lab Practical: 6-1, 6-2 TECH: Interactive Textbook with ChemASAP: Assessment: 6.2; Transparencies: T67-T69; www.SciLinks.org web code: cdn-1061, cdn-1062
xv. xv determine the group of an element, given the chemical formula of a compound, e.g., XCl or XCl2 (3.1z)	SE/TE: Basis of Concept: 253-254
xvi. explain the placement of an unknown element on the Periodic Table based on its properties (3.1v, 3.1w, 3.1x, 3.1y)	SE/TE: 156 TE: Teacher Demo: 155 TR: Guided Reading and Study Workbook: 6.1 LAB: Small-Scale Lab Manual: Lab 9 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1; www.SciLinks.org web code: cdn-1062

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
xvii. classify an organic compound based on its structural or condensed structural formula O (i.e., CH3COOH or -C-C-OH) (3.1ff, 3.1gg, 3.1hh)	SE/TE: 726-727, 730-732, 735-736, 737-738, 740-743; Quick Lab: 707; Small-Scale Lab: 708 TE: Class Activity: 727, 738; Teacher Demo: 748 TR: Guided Reading and Study Workbook: 23.1, 23.2, 23.3 LAB: Laboratory Manual: 291-298 TECH: Interactive Textbook with ChemASAP: Assessment: 23.1, 23.2, 23.3; Transparencies: T262-T264, T268-T269
xviii. describe the states of the elements at STP (3.1jj)	SE/TE: 161-163 TR: Guided Reading and Study Workbook: 6.2 TECH: Interactive Textbook with ChemASAP: Assessment: 6.2
xix. distinguish among ionic, molecular, and metallic substances, given their properties (3.1dd, 3.1w, 5.2g, 5.2h)	SE/TE: 196-199, 201-202, 213-214, 244; Inquiry Activity: 186 TE: Class Activity: 197; Teacher Demo: 197, 202 TR: Guided Reading and Study Workbook: 7.2, 7.3 LAB: Laboratory Manual: 67-72; Lab Practical: 7-1 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2, 7.3
xx. draw a structural formula with the functional group(s) on a straight chain hydrocarbon backbone, when given the IUPAC name for the compound (3.1ff, 3.1hh)	SE/TE: 696-697, 699-700, 730-731, 737; Quick Lab: 706; Small-Scale Lab: 708 TE: Class Activity: 695, 704; Teacher Demo: 694, 696 TR: Guided Reading and Study Workbook: 22.1, 23.2 LAB: Laboratory Manual: 291-298; Small-Scale Lab Manual: Lab 37 TECH: Interactive Textbook with ChemASAP: Assessment: 22.1, 23.2; Transparencies: T253-T255; www.SciLinks.org web code: cdn-1221

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
xx. draw structural formulas for alkanes, alkenes, and alkynes containing a maximum of ten carbon atoms (3.1ff, 3.1gg)	SE/TE: 694-700, 702-703 TE: Class Activity: 695; Teacher Demo: 694, 696 TR: Guided Reading and Study Workbook: 22.1, 22.2 LAB: Laboratory Manual: 291-298 TECH: Interactive Textbook with ChemASAP: Assessment: 22.1, 22.2; Animation: 22.28; Transparencies: T253-T255, T256; www.SciLinks.org web code: cdn-1221
xxi. use a simple particle model to differentiate among properties of solids, liquids, and gases (3.1jj, 3.1kk)	SE/TE: 385-386, 390-391, 396; Small-Scale Lab: 400 TE: Class Activity: 388; Teacher Demo: 397 TR: Guided Reading and Study Workbook: 13.1, 13.2, 13.3 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 13.2, 13.3; Animation 2.1; www.SciLinks.org web code: cdn-1141
xxii. compare the entropy of phases of matter (3.1mm)	SE/TE: 569-570 TE: Teacher Demo: 570 TR: Guided Reading and Study Workbook: 18.4 TECH: Interactive Textbook with ChemASAP: Assessment: 18.4; www.SciLinks.org web code: cdn-1184
xxiii. describe the processes and uses of filtration, distillation, and chromatography in the separation of a mixture (3.1nn)	SE/TE: 46-47; Quick Lab 45 TR: Guided Reading and Study Workbook: 2.2 LAB: Laboratory Manual: 167-172, 199-202; Small-Scale Lab Manual: Lab 11; Lab Practical: 16-1 TECH: Interactive Textbook with ChemASAP: Assessment: 2.2
xxiv. interpret and construct solubility curves (3.1oo)	SE/TE: 474, 501 TR: Guided Reading and Study Workbook: 16.1 TECH: Interactive Textbook with ChemASAP: Assessment: 16.1; Transparencies: ; www.SciLinks.org web code: cdn-1161

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
xxv. apply the adage "like dissolves like" to real-world situations (3.1oo)	SE/TE: 473 TR: Guided Reading and Study Workbook: 16.1 TECH: Interactive Textbook with ChemASAP: Assessment: 16.1; www.SciLinks.org web code: cdn-1161
xxvi. interpret solution concentration data (3.1pp)	SE/TE: 480, 485-486, 491; Small-Scale Lab: 497 TE: Class Activity: 483, 493; Teacher Demo: 485 TR: Guided Reading and Study Workbook: 16.2, 16.4 TECH: Interactive Textbook with ChemASAP: Assessment: 16.2, 16.4
xxvii. use solubility curves to distinguish among saturated, supersaturated, and unsaturated solutions (3.1oo)	SE/TE: 473-474 TR: Guided Reading and Study Workbook: 16.1 TECH: Interactive Textbook with ChemASAP: Assessment: 16.1; Transparencies: ; www.SciLinks.org web code: cdn-1161
xxviii. calculate solution concentration in molarity (M), percent mass, and parts per million (ppm) (3.1pp)	SE/TE: 480-482, 485-486, 491-493; Small-Scale Lab: 497 TE: Class Activity: 482, 483, 493; Teacher Demo: 485 TR: Guided Reading and Study Workbook: 16.2, 16.4 TECH: Interactive Textbook with ChemASAP: Assessment: 16.2, 16.4; Transparencies: T171-T173; www.SciLinks.org web code: cdn-1163
xxix. describe the preparation of a solution, given the molarity (3.1pp)	SE/TE: 483-484; Small-Scale Lab: 497 TE: Class Activity: 482; Teacher Demo: 485 TR: Guided Reading and Study Workbook: 16.2 TECH: Interactive Textbook with ChemASAP: Assessment: 16.2
xxx. given properties, identify substances as Arrhenius acids or Arrhenius bases (3.1uu)	SE/TE: 588-590 TR: Guided Reading and Study Workbook: 19.1 TECH: Interactive Textbook with ChemASAP: Assessment: 19.1; Animation: 19.25; www.SciLinks.org web code: cdn-1191

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM		PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
xxxi.	identify solutions as acid, base, or neutral based upon the pH (3.1ss)	SE/TE: 597-598 TE: Class Activity: 595 TR: Guided Reading and Study Workbook: 19.2 LAB: Laboratory Manual: 247-250; Small-Scale Lab Manual: Lab 29; Lab Practical: 19-2 TECH: Interactive Textbook with ChemASAP: Assessment: 19.2; Animation: 19.25; www.SciLinks.org web code: cdn-1192
xxxii.	interpret changes in acid-base indicator color (3.1ss)	SE/TE: 601-602; Quick Lab: 604 TE: Class Activity: 603; Teacher Demo: 600, 601 TR: Guided Reading and Study Workbook: 19.2 LAB: Laboratory Manual: 247-250 TECH: Interactive Textbook with ChemASAP: Assessment: 19.2
xxxiii.	write simple neutralization reactions when given the reactants (3.1xx)	SE/TE: 612-613 TR: Guided Reading and Study Workbook: 19.4 LAB: Laboratory Manual: 255-258 TECH: Interactive Textbook with ChemASAP: Assessment: 19.4
xxxiv.	calculate the concentration or volume of a solution, using titration data (3.1zz)	SE/TE: 613-616 TE: Teacher Demo: 613, 615 TR: Guided Reading and Study Workbook: 19.4 LAB: Laboratory Manual: 259-266; Small-Scale Lab Manual: Lab 30 TECH: Interactive Textbook with ChemASAP: Assessment: 19.4; Transparencies: T225-T226
xxxv.	use particle models/diagrams to differentiate among elements, compounds, and mixtures (3.1r)	SE/TE: 50 TE: Class Activity: 50 TR: Guided Reading and Study Workbook: 2.3 TECH: Interactive Textbook with ChemASAP: Assessment: 2.3
3.2	Use atomic and molecular models to explain common chemical reactions.	SE/TE: 320-324; Inquiry Activity: 320 TE: Teacher Demo: 327 TR: Guided Reading and Study Workbook: 11.1

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
(Continued) 3.2 Use atomic and molecular models to explain common chemical reactions.	(Continued) TECH: Interactive Textbook with ChemASAP: Assessment: 11.1; Transparencies: T113-T114; www.SciLinks.org web code: cdn-1111
i. distinguish between chemical and physical changes (3.2a)	SE/TE: 42, 53-54 TE: Teacher Demo: 54 TR: Guided Reading and Study Workbook: 2.1, 2.4 LAB: Laboratory Manual: 25-32; Small-Scale Lab Manual: Lab 2; Lab Practical: 2-1 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.4; www.SciLinks.org web code: cdn-1024
ii. identify types of chemical reactions (3.2b, 3.2c)	SE/TE: 330-339 TE: Class Activity: 340, 341; Teacher Demo: 333, 334, 335, 337, 338 TR: Guided Reading and Study Workbook: 11.2 LAB: Laboratory Manual: 91-96; Small-Scale Lab Manual: Lab 14 TECH: Interactive Textbook with ChemASAP: Assessment: 11.2; Transparencies: T118-T120; www.SciLinks.org web code: cdn-1112, cdn-1114
iii. determine a missing reactant or product in a balanced equation (3.2c, 3.2d)	SE/TE: 337-339 TR: Guided Reading and Study Workbook: 11.2 LAB: Laboratory Manual: 91-96 TECH: Interactive Textbook with ChemASAP: Assessment: 11.2
iv. identify organic reactions (3.2c)	SE/TE: 728-729, 733-735, 743-745, 747-752; Inquiry Activity: 724 TE: Teacher Demo: 742, 744 TR: Guided Reading and Study Workbook: 23.1, 23.2, 23.3, 23.4 LAB: Laboratory Manual: 299-304; Lab Practical: 23-1 TECH: Interactive Textbook with ChemASAP: Assessment: 23.1, 23.2, 23.3, 23.4

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
v. balance equations, given the formulas of reactants and products (3.2a, 3.3a, 3.3c)	SE/TE: 324-329; Inquiry Activity: 320; Quick Lab: 326 TE: Teacher Demo: 327 TR: Guided Reading and Study Workbook: 11.1, 11.2 LAB: Laboratory Manual: 127-132 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1, 11.2; Simulation: 11.4; Transparencies: T113-T117; www.SciLinks.org web code: cdn-1111
vi. write and balance half-reactions for oxidation and reduction of free elements and their monatomic ions (3.2f, 3.2h)	SE/TE: 632-634, 645-654, 743-745; Small-Scale Lab: 665 TE: Class Activity: 641, 642; Teacher Demo: 632, 640, 744 TR: Guided Reading and Study Workbook: 20.1, 20.3, 23.3 LAB: Laboratory Manual: 275-278; Small-Scale Lab Manual: Lab 34; Lab Practical: 20-1 TECH: Interactive Textbook with ChemASAP: Assessment: 20.1, 20.3, 23.3; Transparencies: T238-T241; www.SciLinks.org web code: cdn-1202, cdn-1203
vii. identify and label the parts of a voltaic cell (cathode, anode, salt bridge) and direction of electron flow, given the reaction equation (3.2k)	SE/TE: 665-667 TE: Teacher Demo: 667, 668 TR: Guided Reading and Study Workbook: 21.1 LAB: Small-Scale Lab Manual: Lab 35 TECH: Interactive Textbook with ChemASAP: Assessment: 21.1; Simulation: 21.27; Transparencies: T242-T245
viii. identify and label the parts of an electrolytic cell (cathode, anode) and direction of electron flow, given the reaction equation (3.2l)	SE/TE: 678-681; Small-Scale Lab: 684; Technology & Society: 685 TR: Guided Reading and Study Workbook: 21.3 LAB: Laboratory Manual: 287-290; Lab Practical: 21-1 TECH: Interactive Textbook with ChemASAP: Assessment: 21.3; Transparencies: T250-T252; www.SciLinks.org web code: cdn-1213

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
ix. compare and contrast voltaic and electrolytic cells (3.2j)	SE/TE: 666-670, 678-681 TE: Teacher Demo: 667, 668 TR: Guided Reading and Study Workbook: 21.1, 21.3 LAB: Laboratory Manual: 279-286, 287-290 TECH: Interactive Textbook with ChemASAP: Assessment: 21.1, 21.3; Transparencies: T242-T245, T250-T252; www.SciLinks.org web code: cdn-1213
x. use an activity series to determine whether a redox reaction is spontaneous (3.2k)	SE/TE: 333
3.3 Apply the principle of conservation of mass to chemical reactions.	SE/TE: 55, 325-327, 356-358; Inquiry Activity: 320, 352 TE: Teacher Demo: 327, 357 TR: Guided Reading and Study Workbook: 11.1, 12.1 LAB: Laboratory Manual: 121-126, 127-132; Small-Scale Lab Manual: Lab 15; Lab Practical: 12-1 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1, 12.1; Simulation: 12.6; Transparencies: T122-T125; www.SciLinks.org web code: cdn-1121
i. balance equations, given the formulas for reactants and products (3.3c)	SE/TE: 325-329, 353-355; Inquiry Activity: 320, 352 TE: Teacher Demo: 327, 357 TR: Guided Reading and Study Workbook: 11.1, 12.1 LAB: Laboratory Manual: 121-126, 127-132; Small-Scale Lab Manual: Lab 15; Lab Practical: 12-1 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1, 12.1; Simulation: 12.6; Transparencies: T122-T125; www.SciLinks.org web code: cdn-1121
ii. interpret balanced chemical equations in terms of conservation of matter and energy (3.3a, 3.3c)	SE/TE: 356-358; Inquiry Activity: 352 TE: Teacher Demo: 357 TR: Guided Reading and Study Workbook: 12.1 LAB: Laboratory Manual: 121-126, 127-132; Lab Practical: 12-1 TECH: Interactive Textbook with ChemASAP: Assessment: 12.1; Transparencies: T122-T125; www.SciLinks.org web code: cdn-1121

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
iii. create and use models of particles to demonstrate balanced equations (3.3a, 3.3c)	SE/TE: 324-327; Inquiry Activity: 320 TR: Guided Reading and Study Workbook: 11.1 LAB: Small-Scale Lab Manual: Lab 15 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1; www.SciLinks.org web code: cdn-1121
iv. calculate simple mole-mole stoichiometry problems, given a balanced equation (3.3.c)	SE/TE: 359-366; Small-Scale Lab: 367 TE: Class Activity: 365; Teacher Demo: 361 TR: Guided Reading and Study Workbook: 12.2 LAB: Laboratory Manual: 121-126; Small-Scale Lab Manual: Lab 17, 18; Probeware Lab Manual: Analysis of Baking Soda TECH: Interactive Textbook with ChemASAP: Assessment: 12.2; Transparencies: T122-T125; www.SciLinks.org web code: cdn-1121
v. determine the empirical formula from a molecular formula (3.3.d)	SE/TE: 309-311 TR: Guided Reading and Study Workbook: 10.3 LAB: Laboratory Manual: 85-90; Lab Practical: 10-1 TECH: Interactive Textbook with ChemASAP: Assessment: 10.3
vi. determine the mass of a given number of moles of a substance (3.3.f)	SE/TE: 297-299, 303; Small-Scale Lab: 304 TE: Teacher Demo: 294 TR: Guided Reading and Study Workbook: 10.2 TECH: Interactive Textbook with ChemASAP: Assessment: 10.2; Transparencies: ; www.SciLinks.org web code: cdn-1104
vii. determine the molecular formula, given the empirical formula and the molecular mass (3.3.d)	SE/TE: 311-312 TE: Class Activity: 309 TR: Guided Reading and Study Workbook: 10.3 LAB: Laboratory Manual: 85-90; Lab Practical: 10-1 TECH: Interactive Textbook with ChemASAP: Assessment: 10.3

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
viii. calculate the formula mass and gram-formula mass (3.3.f)	SE/TE: 293-296 TE: Class Activity: 295; Teacher Demo: 294 TR: Guided Reading and Study Workbook: 10.1 TECH: Interactive Textbook with ChemASAP: Assessment: 10.1; www.SciLinks.org web code: cdn-1104
ix. determine the number of moles of a substance, given its mass (3.3f)	SE/TE: 299, 303; Small-Scale Lab: 304 TE: Class Activity: 295; Teacher Demo: 294 TR: Guided Reading and Study Workbook: 10.2 LAB: Small-Scale Lab Manual: Lab 13 TECH: Interactive Textbook with ChemASAP: Assessment: 10.2; www.SciLinks.org web code: cdn-1104
3.4 Use kinetic molecular theory (KMT) to explain rates of reactions and the relationships among temperature, pressure, and volume of a substance.	SE/TE: 385-389, 413-417; Inquiry Activity: 384 TE: Class Activity: 388; Teacher Demo: 386, 387 TR: Guided Reading and Study Workbook: 13.1, 14.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 14.1; Transparencies: T139-T141, T150-T151; www.SciLinks.org web code: cdn-1131
i. explain the gas laws in terms of KMT (3.4c)	SE/TE: 418-423 TE: Class Activity: 419, 422 TR: Guided Reading and Study Workbook: 14.2 LAB: Laboratory Manual: 147-154, 155-162 TECH: Interactive Textbook with ChemASAP: Assessment: 14.2; Animation: 13.9; Simulation: 14.9, 14.10, 14.11; Transparencies: T152-T157; www.SciLinks.org web code: cdn-1131, cdn-1141
ii. solve problems, using the combined gas laws (3.4c)	SE/TE: 424-425, 426-427 TR: Guided Reading and Study Workbook: 14.2, 14.3 TECH: Interactive Textbook with ChemASAP: Assessment: 14.2, 14.3

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
iii. convert temperatures in Celsius degrees (oC) to kelvins (K), and kelvins to Celsius degrees (3.4e)	SE/TE: 77-78 TR: Guided Reading and Study Workbook: 3.2 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2; Transparencies: T30; www.SciLinks.org web code: cdn-1032
iv. describe the concentration of particles and rates of opposing reactions in an equilibrium system (3.4i)	SE/TE: 550-551 TR: Guided Reading and Study Workbook: 18.2 LAB: Laboratory Manual: 237-242 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2; Animation: 18.23
v. qualitatively describe the effect of stress on equilibrium, using LeChatelier's principle (3.4j)	SE/TE: 552-555 TE: Teacher Demo: 555 TR: Guided Reading and Study Workbook: LAB: Laboratory Manual: 237-242; Small-Scale Lab Manual: Lab 29 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2; Animation: 18.23; Simulation: 18.24
vi. use collision theory to explain how various factors, such as temperature, surface area, and concentration, influence the rate of reaction (3.4d)	SE/TE: 541-547; Inquiry Activity: 540; Quick Lab: 544 TE: Teacher Demo: 546 TR: Guided Reading and Study Workbook: 18.1 LAB: Laboratory Manual: 225-230, 231-236; Small-Scale Lab Manual: Lab 28; Lab Practical: 18-1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1; Animation: 18.22; Simulation: 18.23; Transparencies: T196-T198; www.SciLinks.org web code: cdn-1181
vii. identify examples of physical equilibria as solution equilibrium and phase equilibrium, including the concept that a saturated solution is at equilibrium(3.4h)	SE/TE: 392, 402-403, 560-564 TE: Teacher Demo: 392 TR: Guided Reading and Study Workbook: 13.2 TECH: Interactive Textbook with ChemASAP: Assessment: 13.2, 13.4

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
Key Idea 4: *Energy exists in many forms, and when these forms change, energy is conserved.*	SE/TE: 505-507, 527-532; Quick Lab: 504; Small-Scale Lab: 533; Technology & Society: 518-519 TE: Class Activity: 508; Teacher Demo: 506, 530 TR: Guided Reading and Study Workbook: 17.1, 17.4 LAB: Laboratory Manual: 211-216, 217-224; Probeware Lab Manual: Heat of Combustion of a Candle; Lab Practical: Heat of Reaction TECH: Interactive Textbook with ChemASAP: Assessment: 17.1, 17.4; Transparencies: T180-T181
4.1 Observe and describe transmission of various forms of energy.	SE/TE: 520-526, 527-532; Quick Lab: 504; Small-Scale Lab: 533; Technology & Society: 518-519 TE: Class Activity: 522, 524, 525; Teacher Demo: 515, 523 TR: Guided Reading and Study Workbook: 17.3, 17.4 LAB: Laboratory Manual: 211-216, 217-224; Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice, Heat of Combustion of a Candle; Lab Practical: 17-2 TECH: Interactive Textbook with ChemASAP: Assessment: 17.3, 17.4; Animation 17.12; Transparencies: T187-T191, T192-T195; www.SciLinks.org web code: cdn-1171
i. distinguish between endothermic and exothermic reactions, using energy terms in a reaction equation, ΔH, potential energy diagrams, or experimental data (4.1b)	SE/TE: 506-507, 514-517, 520-526, 527-532; Inquiry Activity: 504; Small-Scale Lab: 533 TE: Class Activity: 508; Teacher Demo: 506, 515 TR: Guided Reading and Study Workbook: 17.1, 17.2, 17.3, 17.4 LAB: Laboratory Manual: 211-216, 217-224; Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice, Heat of Combustion of a Candle; Lab Practical: 17-2 TECH: Interactive Textbook with ChemASAP: Assessment: 17.1, 17.2, 17.3, 17.4

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
ii. read and interpret potential energy diagrams: PE reactants, PE products, activation energy (with or without a catalyst), heat of reaction (4.1c, 4.1d)	SE/TE: 543-544, 547 TR: Guided Reading and Study Workbook: 18.1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1
4.2 Explain heat in terms of kinetic molecular theory.	SE/TE: 505
i. distinguish between heat energy and temperature in terms of molecular motion and amount of matter (4.2a, 4.2b)	SE/TE: 505 TR: Guided Reading and Study Workbook: 17.1
ii. explain phase change in terms of the changes in energy and intermolecular distances (4.2b)	SE/TE: 391-395, 401 TE: Class Activity: 394, 525; Teacher Demo: 523 TR: Guided Reading and Study Workbook: 13.2, 13.4 LAB: Laboratory Manual: 139-146; Probeware Lab Manual: Heat of Fusion of Ice; Lab Practical: 13-1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.2, 13.4; Animation: 17.12; Transparencies: T142-T144
iii. qualitatively interpret heating and cooling curves in terms of changes in kinetic and potential energy, heat of vaporization, heat of fusion, and phase changes (4.2a, 4.2c)	SE/TE: 520-526 TR: Guided Reading and Study Workbook: 17.3 LAB: Laboratory Manual: 203-210; Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice TECH: Interactive Textbook with ChemASAP: Assessment: 17.3; Transparencies: T187-T191
iv. calculate the heat involved in a phase or temperature change for a given sample of matter (4.2c)	SE/TE: 508-510, 511-513, 520-524; Quick Lab: 522 TE: Class Activity: 512 TR: Guided Reading and Study Workbook: 17.1, 17.2, 17.3 LAB: Laboratory Manual: 211-216; Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice; Lab Practical: 17-1 TECH: Interactive Textbook with ChemASAP: Assessment: 17.1, 17.2, 17.3; Animation: 17.12

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
4.4 Explain the benefits and risks of radioactivity.	SE/TE: 799-802, 806, 810-813; Technology & Society: 814-815 TE: Teacher Demo: 800 TR: Guided Reading and Study Workbook: 25.1, 25.3 LAB: Laboratory Manual: 311-317 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1, 25.3; Transparencies: T294; www.SciLinks.org web code: cdn-1252, cdn-1254
i. calculate the initial amount, the fraction remaining, or the halflife of a radioactive isotope, given two of the three variables (4.4a)	SE/TE: 803-806; Inquiry Activity: 798; Small-Scale Lab: 809; Technology & Society: 814-815 TR: Guided Reading and Study Workbook: 25.2 LAB: Small-Scale Lab Manual: Lab 41 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2; Transparencies: T289-T290; www.SciLinks.org web code: cdn-1252
ii. compare and contrast fission and fusion reactions (4.4b, 4.4.f, 5.3b)	SE/TE: 810-813 TE: Teacher Demo: 811 TR: Guided Reading and Study Workbook: 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.3; Animation: 25.30; Transparencies: T293
iii. complete nuclear equations; predict missing particles from nuclear equations (4.4c)	SE/TE: 800-802, 804, 807-808; Small-Scale Lab: 809 TR: Guided Reading and Study Workbook: 25.1, 25.2 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1, 25.2; Transparencies: T288, T292
iv. identify specific uses of some common radioisotopes, such as I-131 in diagnosing and treating thyroid disorders, C-14 to C-12 ratio in dating once-living organisms, U-238 to Pb-206 ratio in dating geological formations, and Co-60 in treating cancer (4.4d)	SE/TE: 806, 816-819; Technology & Society: 814-815 TR: Guided Reading and Study Workbook: 25.4 TECH: Interactive Textbook with ChemASAP: Assessment: 25.4; Transparencies: ; www.SciLinks.org web code: cdn-1252, cdn-1254

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
Key Idea 5: *Energy and matter interact through forces that result in changes in motion.*	SE/TE: 230-236, 391-395; Inquiry Activity: 100 TR: Guided Reading and Study Workbook: 8.3 TECH: Interactive Textbook with ChemASAP: Assessment: 8.3
5.2 Students will explain chemical bonding in terms of the behavior of electrons.	SE/TE: 187-205, 213-214, 217-229, 230-236; Inquiry Activity: 212 TE: Class Activity: 220 TR: Guided Reading and Study Workbook: 8.1, 8.2, 8.3 TECH: Interactive Textbook with ChemASAP: Assessment: 8.1, 8.2, 8.3; www.SciLinks.org web code: cdn-1072, cdn-1081, cdn-1083
i. demonstrate bonding concepts, using Lewis dot structures representing valence electrons: (5.2a, 5.2d)	SE/TE: 188-193, 217-225, 228-229 TE: Class Activity: 218 TR: Guided Reading and Study Workbook: 7.1, 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1, 8.2; Transparencies: T75-T78, T87-T89; www.SciLinks.org web code: cdn-1082
• transferred (ionic bonding)	SE/TE: 194-196 TR: Guided Reading and Study Workbook: 7.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2; www.SciLinks.org web code: cdn-1092
• shared (covalent bonding)	SE/TE: 217-225, 228-229 TE: Class Activity: 218, 220; Teacher Demo: 228 TR: Guided Reading and Study Workbook: 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 8.2; Simulation: 8.16; Transparencies: T90-T92; www.SciLinks.org web code: cdn-1081
• in a stable octet	SE/TE: 189-193 TE: Class Activity: 190 TR: Guided Reading and Study Workbook: 7.1 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1; Transparencies: T76-T78

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
ii. compare the physical properties of substances based on chemical bonds and intermolecular forces, e.g., conductivity, malleability, solubility, hardness, melting point, and boiling point (5.2n)	SE/TE: 196-199, 201-203, 226, 243-244; Inquiry Activity: 186; Quick Lab: 226; Small-Scale Lab: 245; Technology & Society: 204-205, 242 TE: Class Activity: 197; Teacher Demo: 197 TR: Guided Reading and Study Workbook: 7.2, 7.3, 8.2, 8.4 LAB: Laboratory Manual: 67-72; Probeware Lab Manual: Strengths of Covalent Bonds; Lab Practical: 7-1 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2, 7.3, 8.2, 8.4; www.SciLinks.org web code: cdn-1072, cdn-1081
iii. explain vapor pressure, evaporation rate, and phase changes in terms of intermolecular forces (5.2m)	SE/TE: 391-395 TE: Class Activity: 393; Teacher Demo: 392 TR: Guided Reading and Study Workbook: 13.2 TECH: Interactive Textbook with ChemASAP: Assessment: 13.2; Animation: 13.9, 13.10; www.SciLinks.org web code: cdn-1134
iv. determine the noble gas configuration an atom will achieve by bonding (5.2b)	SE/TE: 188-193 TE: Class Activity: 190 TR: Guided Reading and Study Workbook: 7.1 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1; Transparencies: T75-T78
v. distinguish between nonpolar covalent bonds (two of the same nonmetals) and polar covalent bonds (5.2k)	SE/TE: 237-240 TE: Class Activity: 238; Teacher Demo: 240 TR: Guided Reading and Study Workbook: 8.4 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
STANDARD 4 The Physical Setting	
Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.	
Key Idea 3: *Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.*	SE/TE: 39-42, 48-51, 53-55, 158-160, 164-167, 196-199, 201-202, 214, 237-244; Inquiry Activity: 154; Appendix: R6-R45 TE: Teacher Demo: 165, 240, 243 TR: Guided Reading and Study Workbook: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4 LAB: Laboratory Manual: 63-66 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4; www.SciLinks.org web code: cdn-1021, cdn-1061, cdn-1062
PERFORMANCE INDICATOR 3.1	
Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them.	SE/TE: 39-42, 48-51, 53-55, 158-160, 164-167, 196-199, 201-202, 214, 237-244; Inquiry Activity: 154; Appendix: R6-R45 TE: Teacher Demo: 165, 240, 243 TR: Guided Reading and Study Workbook: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4 LAB: Laboratory Manual: 63-66 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.3, 2.4, 6.1, 6.2, 7.2, 7.3, 8.4; www.SciLinks.org web code: cdn-1021, cdn-1061, cdn-1062
Major Understandings:	
3.1a The modern model of the atom has evolved over a long period of time through the work of many scientists.	SE/TE: 101-102, 104-108, 127-130 TE: Class Activity: 106; Teacher Demo: 105 TR: Guided Reading and Study Workbook: 4.1, 4.2, 5.1 LAB: Laboratory Manual: 45-48 TECH: Interactive Textbook with ChemASAP: Assessment: 4.1, 4.2, 5.1; Animation: 4.4; Transparencies: T43-T44, T45-T47; www.SciLinks.org web code: cdn-1042

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1b Each atom has a nucleus, with an overall positive charge, surrounded by negatively charged electrons.	SE/TE: 104-105, 128-129 TE: Teacher Demo: 105 TR: Guided Reading and Study Workbook: 4.2, 5.1 LAB: Laboratory Manual: 45-48; Lab Practical: 5-1 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2, 5.1
3.1c Subatomic particles contained in the nucleus include protons and neutrons.	SE/TE: 106, 129 TR: Guided Reading and Study Workbook: 4.2, 5.1 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2, 5.1
3.1d The proton is positively charged, and the neutron has no charge. The electron is negatively charged.	SE/TE: 105-106 TR: Guided Reading and Study Workbook: 4.2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2
3.1e Protons and electrons have equal but opposite charges. The number of protons equals the number of electrons in an atom.	SE/TE: 105-106 TR: Guided Reading and Study Workbook: 4.2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2
3.1f The mass of each proton and each neutron is approximately equal to one atomic mass unit. An electron is much less massive than a proton or a neutron.	SE/TE: 105-106 TR: Guided Reading and Study Workbook: 4.2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2
3.1g The number of protons in an atom (atomic number) identifies the element. The sum of the protons and neutrons in an atom (mass number) identifies an isotope. Common notations that represent isotopes include: 14C, 14C, carbon-14, C-14.	SE/TE: 110-113 TR: Guided Reading and Study Workbook: 4.3 LAB: Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3
3.1h In the wave-mechanical model (electron cloud model) the electrons are in orbitals, which are defined as the regions of the most probable electron location (ground state).	SE/TE: 129-132 TE: Class Activity: 129, 130 TR: Guided Reading and Study Workbook: 5.1 TECH: Interactive Textbook with ChemASAP: Assessment: 5.1; Animation: 5.15

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1i Each electron in an atom has its own distinct amount of energy.	SE/TE: 128-129 TE: Class Activity: 129; Teacher Demo: 128 TR: Guided Reading and Study Workbook: 5.1 LAB: Laboratory Manual: 53-56 TECH: Interactive Textbook with ChemASAP: Assessment: 5.1
3.1j When an electron in an atom gains a specific amount of energy, the electron is at a higher energy state (excited state).	SE/TE: 128-129, 142-143 TE: Class Activity: 129; Teacher Demo: 128 TR: Guided Reading and Study Workbook: 5.1, 5.3 LAB: Laboratory Manual: 53-56 TECH: Interactive Textbook with ChemASAP: Assessment: 5.1, 5.3
3.1k When an electron returns from a higher energy state to a lower energy state, a specific amount of energy is emitted. This emitted energy can be used to identify an element.	SE/TE: 128-129, 141-143; Small-Scale Lab: 137 TE: Class Activity: 129; Teacher Demo: 128 TR: Guided Reading and Study Workbook: 5.1, 5.3 LAB: Laboratory Manual: 49-52, 53-56, 57-62; Small-Scale Lab Manual: Lab 7, 8; Lab Practical: 5-1, 5-2 TECH: Interactive Textbook with ChemASAP: Assessment: 5.1, 5.3; Animation 5.13
3.1l The outermost electrons in an atom are called the valence electrons. In general, the number of valence electrons affects the chemical properties of an element.	SE/TE: 164-165, 187-188 TE: Teacher Demo: 188 TR: Guided Reading and Study Workbook: 6.2, 7.1 TECH: Interactive Textbook with ChemASAP: Assessment: 6.2, 7.1; www.SciLinks.org web code: cdn-1062, cdn-1082
3.1m Atoms of an element that contain the same number of protons but a different number of neutrons are called isotopes of that element.	SE/TE: 112-113 TE: Class Activity: 112 TR: Guided Reading and Study Workbook: 4.3 LAB: Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3; www.SciLinks.org web code: cdn-1043

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1n The average atomic mass of an element is the weighted average of the masses of its naturally occurring isotopes.	SE/TE: 114-117; Small-Scale Lab: 120 TE: Teacher Demo: TR: Guided Reading and Study Workbook: 4.3 LAB: Small-Scale Lab Manual: Lab 6 TECH: Interactive Textbook with ChemASAP: Assessment: 4.3; www.SciLinks.org web code: cdn-1043
3.1o Stability of an isotope is based on the ratio of neutrons and protons in its nucleus. Although most nuclei are stable, some are unstable and spontaneously decay, emitting radiation.	SE/TE: 799-800, 803-804 TR: Guided Reading and Study Workbook: 25.1 LAB: Laboratory Manual: 311-318; Lab Practical: 25-1 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1; Simulation: 25.30
3.1p Spontaneous decay can involve the release of alpha particles, beta particles, positrons, and/or gamma radiation from the nucleus of an unstable isotope. These emissions differ in mass, charge, ionizing power, and penetrating power.	SE/TE: 800-802 TE: Teacher Demo: 817 TR: Guided Reading and Study Workbook: 25.1 LAB: Laboratory Manual: 311-318; Lab Practical: 25-1 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1; Simulation 25.30
3.1q Matter is classified as a pure substance or as a mixture of substances.	SE/TE: 39-40, 44-46; Inquiry Activity: 38; Quick Lab: 45 TE: Teacher Demo: 46 TR: Guided Reading and Study Workbook: 2.1, 2.2 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.2; www.SciLinks.org web code: cdn-1021
3.1r A pure substance (element or compound) has a constant composition and constant properties throughout a given sample, and from sample to sample.	SE/TE: 40, 50 TE: Class Activity: 50 TR: Guided Reading and Study Workbook: 2.1, 2.3 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.3; www.SciLinks.org web code: cdn-1021
3.1s Mixtures are composed of two or more different substances that can be separated by physical means. When different substances are mixed together, a homogeneous or heterogeneous mixture is formed.	SE/TE: 44-47, 50; Quick Lab: 45 TE: Class Activity: 50; Teacher Demo: 46 TR: Guided Reading and Study Workbook: 2.2, 2.3 TECH: Interactive Textbook with ChemASAP: Assessment: 2.2, 2.3; Transparencies: T12-T14

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1t The proportions of components in a mixture can be varied. Each component in a mixture retains its original properties.	SE/TE: 44, 50; Quick Lab: 45 TE: Class Activity: 50; Teacher Demo: 46 TR: Guided Reading and Study Workbook: 2.2, 2.3 TECH: Interactive Textbook with ChemASAP: Assessment: 2.2, 2.3
3.1u Elements are substances that are composed of atoms that have the same atomic number. Elements cannot be broken down by chemical change.	SE/TE: 48 TR: Guided Reading and Study Workbook: 2.3 TECH: Interactive Textbook with ChemASAP: Assessment: 2.3
3.1v Elements can be classified by their properties and located on the Periodic Table as metals, nonmetals, metalloids (B, Si, Ge, As, Sb, Te), and noble gases.	SE/TE: 158-160, 164; Inquiry Activity: 154 TE: Teacher Demo: 155 TR: Guided Reading and Study Workbook: 6.1, 6.2 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1, 6.2; www.SciLinks.org web code: cdn-1023
3.1w Elements can be differentiated by physical properties. Physical properties of substances, such as density, conductivity, malleability, solubility, and hardness, differ among elements.	SE/TE: 39-40; Appendix: R10, R14, R18, R24, R28, R32, R36, R40 TR: Guided Reading and Study Workbook: 2.1 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1; www.SciLinks.org web code: cdn-1021
3.1x Elements can also be differentiated by chemical properties. Chemical properties describe how an element behaves during a chemical reaction.	SE/TE: 53 TE: Teacher Demo: 54 TR: Guided Reading and Study Workbook: 2.4 LAB: Laboratory Manual: 25-32, 33-36; Small-Scale Lab Manual: Lab 2 TECH: Interactive Textbook with ChemASAP: Assessment: 2.4
3.1y The placement or location of an element on the Periodic Table gives an indication of the physical and chemical properties of that element. The elements on the Periodic Table are arranged in order of increasing atomic number.	SE/TE: 157, 161-165; Inquiry Activity: 154 TE: Class Activity: 159; Teacher Demo: 155, 165 TR: Guided Reading and Study Workbook: 6.1, 6.2 LAB: Laboratory Manual: 63-66; Small-Scale Lab Manual: Lab 9; Lab Practical: 6-1, 6-2 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1, 6.2; Transparencies: T67

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1z For Groups 1, 2, and 13-18 on the Periodic Table, elements within the same group have the same number of valence electrons (helium is an exception) and therefore similar chemical properties.	SE/TE: 161-167; Appendix: R6-R45 TE: Class Activity: 166; Teacher Demo: 165 TR: Guided Reading and Study Workbook: 6.2 LAB: Laboratory Manual: 63-66; Lab Practical: 6-1, 6-2 TECH: Interactive Textbook with ChemASAP: Assessment: 6.2; Transparencies: T67-T69; www.SciLinks.org web code: cdn-1062
3.1aaThe succession of elements within the same group demonstrates characteristic trends: differences in atomic radius, ionic radius, electronegativity, first ionization energy, metallic/nonmetallic properties.	SE/TE: 158-160, 170-179; Appendix: R11, R15, R19, R25, R29, R33, R36, R41; Quick Lab: 175; Small-Scale Lab: 179 TE: Class Activity: 172, 173; Teacher Demo: 174 TR: Guided Reading and Study Workbook: 6.1, 6.3 LAB: Laboratory Manual: 63-66; Small-Scale Lab Manual: Lab 9 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1, 6.3; Transparencies: T70-T74; www.SciLinks.org web code: cdn-1063
3.1bb The succession of elements across the same period demonstrates characteristic trends: differences in atomic radius, ionic radius, electronegativity, first ionization energy, metallic/nonmetallic properties.	SE/TE: 158-160, 170-179; Appendix: R11, R15, R19, R25, R29, R33, R36, R41; Quick Lab: 175; Small-Scale Lab: 179 TE: Class Activity: 172, 173; Teacher Demo: 174 TR: Guided Reading and Study Workbook: 6.1, 6.3 LAB: Laboratory Manual: 63-66; Small-Scale Lab Manual: Lab 9 TECH: Interactive Textbook with ChemASAP: Assessment: 6.1, 6.3; Transparencies: T70-T74; www.SciLinks.org web code: cdn-1063
3.1ccA compound is a substance composed of two or more different elements that are chemically combined in a fixed proportion. A chemical compound can be broken down by chemical means. A chemical compound can be represented by a specific chemical formula and assigned a name based on the IUPAC system.	SE/TE: 48-52, 260-267, 268-270, 271-273; Small-Scale Lab: 267 TE: Class Activity: 50, 261, 263, 265; Teacher Demo: 49, 262, 264 TR: Guided Reading and Study Workbook: 2.3, 9.2, 9.3, 9.4 LAB: Small-Scale Lab Manual: Lab 12

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
(Continued) 3.1ccA compound is a substance composed of two or more different elements that are chemically combined in a fixed proportion. A chemical compound can be broken down by chemical means. A chemical compound can be represented by a specific chemical formula and assigned a name based on the IUPAC system.	(Continued) TECH: Interactive Textbook with ChemASAP: Assessment: 2.3, 9.1, 9.2, 9.3, 9.4; Simulation: 9.2; Transparencies: T15-T17, T96-T97, T98, T99; www.SciLinks.org web code: cdn-1072, cdn-1092, cdn-1093, cdn-1094
3.1dd Compounds can be differentiated by their physical and chemical properties.	SE/TE: 39-40, 53, 196-197, 213-214; Inquiry Activity: 38; Quick Lab: 45 TE: Teacher Demo: 197 TR: Guided Reading and Study Workbook: 2.1, 2.4, 7.2, 8.1 LAB: Laboratory Manual: 25-32; Lab Practical: 2-1 TECH: Interactive Textbook with ChemASAP: Assessment: 2.1, 2.4, 7.2, 8.1; www.SciLinks.org web code: cdn-1021
3.1eeTypes of chemical formulas include empirical, molecular, and structural.	SE/TE: 215-216, 218, 309-312, 696-697 TE: Class Activity: 218, 695; Teacher Demo: 215, , 694696 TR: Guided Reading and Study Workbook: 8.1, 10.3, 22.1 LAB: Laboratory Manual: 73-78, 85-90, 291-298; Lab Practical: 10-1, 22-1 TECH: Interactive Textbook with ChemASAP: Assessment: 8.1, 10.3, 22.1
3.1ff Organic compounds contain carbon atoms, which bond to one another in chains, rings, and networks to form a variety of structures. Organic compounds can be named using the IUPAC system.	SE/TE: 693-700, 702-703, 704-708, 709-711; Quick Lab: 706; Small-Scale Lab: 708 TE: Class Activity: 695, 702, 704; Teacher Demo: 694, 696, 697 TR: Guided Reading and Study Workbook: 22.1, 22.2, 22.3, 22.4 LAB: Laboratory Manual: 291-298; Small-Scale Lab Manual: Lab 37; Lab Practical: 22-1 TECH: Interactive Textbook with ChemASAP: Assessment: 22.1, 22.2, 22.3, 22.4; Transparencies: T253-T255, T256, T257-T258, T259, T260-T261; www.SciLinks.org web code: cdn-1221, cdn-1224, cdn-1225

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1gg Hydrocarbons are compounds that contain only carbon and hydrogen. Saturated hydrocarbons contain only single carbon-carbon bonds. Unsaturated hydrocarbons contain at least one multiple carbon-carbon bond.	SE/TE: 693-694, 702 TE: Class Activity: 702; Teacher Demo: 694, 696, 734 TR: Guided Reading and Study Workbook: 22.1, 22.2 LAB: Laboratory Manual: 291-298 TECH: Interactive Textbook with ChemASAP: Assessment: 22.1, 22.2; www.SciLinks.org web code: cdn-1221
3.1hh Organic acids, alcohols, esters, aldehydes, ketones, ethers, halides, amines, amides, and amino acids are categories of organic compounds that differ in their structures. Functional groups impart distinctive physical and chemical properties to organic compounds.	SE/TE: 725-729, 730-736, 737-746, 769-770; Quick Lab: 746 TE: Class Activity: 726, 738; Teacher Demo: 728, 732, 733, 734, 742, 744, 770 TR: Guided Reading and Study Workbook: 23.1, 23.2, 23.3, 24.3 LAB: Laboratory Manual: 299-304; Lab Practical: 23-1 TECH: Interactive Textbook with ChemASAP: Assessment: 23.1, 23.2, 23.3, 24.3; Transparencies: T262-T264, T265-T267, T268-T269; www.SciLinks.org web code: cdn-1231, cdn-1232
3.1ii Isomers of organic compounds have the same molecular formula, but different structures and properties.	SE/TE: 704-708; Quick Lab: 707; Small-Scale Lab: 708 TE: Class Activity: 704 TR: Guided Reading and Study Workbook: 22.3 LAB: Small-Scale Lab Manual: Lab 37 TECH: Interactive Textbook with ChemASAP: Assessment: 22.3; Transparencies: T257-T258
3.1jj The structure and arrangement of particles and their interactions determine the physical state of a substance at a given temperature and pressure.	SE/TE: 385-386, 390-395, 396-399, 401-404; Small-Scale Lab: 400 TE: Class Activity: 388, 394 TR: Guided Reading and Study Workbook: 13.1, 13.2, 13.3, 13.4 LAB: Laboratory Manual: 133-138, 139-146; Lab Practical: 13-1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 13.2, 13.3, 13.4; Animation 2.1; Transparencies: T139-T141, T142-T144, T145-T147, T148-T149; www.SciLinks.org web code: cdn-1134

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1kkThe three phases of matter (solids, liquids, and gases) have different properties.	SE/TE: 385-386, 390-391, 396; Inquiry Activity: 384; Small-Scale Lab: 400 TR: Guided Reading and Study Workbook: 13.1, 13.2, 13.3 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 13.2, 13.3; Animation 2.1
3.1ll Entropy is a measure of the randomness or disorder of a system. A system with greater disorder has greater entropy.	SE/TE: 568-570; Small-Scale Lab: 574 TE: Teacher Demo: 570 TR: Guided Reading and Study Workbook: 18.4 TECH: Interactive Textbook with ChemASAP: Assessment: 18.4; www.SciLinks.org web code: cdn-1184
3.1mm Systems in nature tend to undergo changes toward lower energy and higher entropy.	SE/TE: 569-570; Small-Scale Lab: 574 TE: Teacher Demo: 570 TR: Guided Reading and Study Workbook: 18.4 TECH: Interactive Textbook with ChemASAP: Assessment: 18.4; www.SciLinks.org web code: cdn-1184
3.1nnDifferences in properties such as density, particle size, molecular polarity, boiling and freezing points, and solubility permit physical separation of the components of the mixture.	SE/TE: 45-47, 713; Appendix: R17; Inquiry Activity: 62, 692; Quick Lab: 45; Small-Scale Lab: 245 TE: Teacher Demo: 46 TR: Guided Reading and Study Workbook: 2.2 LAB: Laboratory Manual: 167-172, 199-202 TECH: Interactive Textbook with ChemASAP: Assessment: 2.2
3.1ooA solution is a homogeneous mixture of a solute dissolved in a solvent. The solubility of a solute in a given amount of solvent is dependent on the temperature, the pressure, and the chemical natures of the solute and solvent.	SE/TE: 45, 471-472, 474-477 TE: Teacher Demo: 475 TR: Guided Reading and Study Workbook: 2.2 LAB: Laboratory Manual: 189-194, 195-198; Small-Scale Lab Manual: Lab 25 TECH: Interactive Textbook with ChemASAP: Assessment: 2.2; www.SciLinks.org web code: cdn-1161

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1ppThe concentration of a solution may be expressed in molarity (M), percent by volume, percent by mass, or parts per million (ppm).	SE/TE: 480-482, 485-486; Small-Scale Lab 497 TE: Class Activity: 482, 483, 493; Teacher Demo: 485 TR: Guided Reading and Study Workbook: 16.2 TECH: Interactive Textbook with ChemASAP: Assessment: 16.2; www.SciLinks.org web code: cdn-1163
3.1qqThe addition of a nonvolatile solute to a solvent causes the boiling point of the solvent to increase and the freezing point of the solvent to decrease. The greater the concentration of solute particles, the greater the effect.	SE/TE: 487-490, 494-496 TE: Class Activity: 489 TR: Guided Reading and Study Workbook: 16.3, 16.4 LAB: Laboratory Manual: 203-210 TECH: Interactive Textbook with ChemASAP: Assessment: 16.3, 16.4; Transparencies: T177-T179
3.1rr An electrolyte is a substance which, when dissolved in water, forms a solution capable of conducting an electric current. The ability of a solution to conduct an electric current depends on the concentration of ions.	SE/TE: 452-453, 587-588; Small-Scale Lab 458 TE: Teacher Demo: 453 TR: Guided Reading and Study Workbook: 15.2, 19.1 LAB: Laboratory Manual: 183-188; Probeware Lab Manual: Electrolytes; Lab Practical: 15-1 TECH: Interactive Textbook with ChemASAP: Assessment: 15.2, 19.1
3.1ss The acidity or alkalinity of an aqueous solution can be measured by its pH value. The relative level of acidity or alkalinity of these solutions can be shown by using indicators.	SE/TE: 596-604; Quick Lab 604 TE: Class Activity: 595, 603; Teacher Demo: 600, 601 TR: Guided Reading and Study Workbook: 19.2 LAB: Laboratory Manual: 247-250; Small-Scale Lab Manual: Lab 29; Lab Practical: 19-1, 19-2 TECH: Interactive Textbook with ChemASAP: Assessment: 19.2; Transparencies: T215-T222; www.SciLinks.org web code: cdn-1192
3.1tt On the pH scale, each decrease of one unit of pH represents a tenfold increase in hydronium ion concentration.	SE/TE: 598-600; CHEMath: 599 TR: Guided Reading and Study Workbook: 19.2 LAB: Laboratory Manual: 247-250; Small-Scale Lab Manual: Lab 29 TECH: Interactive Textbook with ChemASAP: Assessment: 19.2; www.SciLinks.org web code: cdn-1192

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.1uuBehavior of many acids and bases can be explained by the Arrhenius theory. Arrhenius acids and bases are electrolytes.	SE/TE: 587-590 TR: Guided Reading and Study Workbook: 19.1 TECH: Interactive Textbook with ChemASAP: Assessment: 19.1; Animation: 19.25
3.1vvArrhenius acids yield H+(aq), hydrogen ion as the only positive ion in an aqueous solution. The hydrogen ion may also be written as H3O+(aq), hydronium ion.	SE/TE: 588-589 TR: Guided Reading and Study Workbook: 19.1 TECH: Interactive Textbook with ChemASAP: Assessment: 19.1; Animation 19.25
3.1ww Arrhenius bases yield OH-(aq), hydroxide ion as the only negative ion in an aqueous solution.	SE/TE: 589-590 TR: Guided Reading and Study Workbook: 19.1 TECH: Interactive Textbook with ChemASAP: Assessment: 19.1; Animation 19.25
3.1xx In the process of neutralization, an Arrhenius acid and an Arrhenius base react to form a salt and water.	SE/TE: 612-613 TR: Guided Reading and Study Workbook: 19.4 LAB: Laboratory Manual: 255-258 TECH: Interactive Textbook with ChemASAP: Assessment: 19.4
3.1yy There are alternate acid-base theories. One theory states that an acid is an H+ donor and a base is an H+ acceptor.	SE/TE: 590-593 TR: Guided Reading and Study Workbook: 19.1 TECH: Interactive Textbook with ChemASAP: Assessment: 19.1; Animation: 19.25
3.1zz Titration is a laboratory process in which a volume of a solution of known concentration is used to determine the concentration of another solution.	SE/TE: 613-616 TE: Teacher Demo: 613, 615 TR: Guided Reading and Study Workbook: 19.4 LAB: Laboratory Manual: 259-266; Small-Scale Lab Manual: Lab 30; Lab Practical: 19-3 TECH: Interactive Textbook with ChemASAP: Assessment: 19.4; Simulation 19.26; Transparencies: T225-T226

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
PERFORMANCE INDICATOR 3.2	
Use atomic and molecular models to explain common chemical reactions.	SE/TE: 320-324; Inquiry Activity: 320 TE: Teacher Demo: 327 TR: Guided Reading and Study Workbook: 11.1 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1; Transparencies: T113-T114; www.SciLinks.org web code: cdn-1111
Major Understandings:	
3.2a A physical change results in the rearrangement of existing particles in a substance. A chemical change results in the formation of different substances with changed properties.	SE/TE: 42, 53-54 TR: Guided Reading and Study Workbook: 2.4 TECH: Interactive Textbook with ChemASAP: Assessment: 2.4
3.2b Types of chemical reactions include synthesis, decomposition, single replacement, and double replacement.	SE/TE: 330-339; Technology & Society: 340-341 TE: Class Activity: 340; Teacher Demo: 333, 334, 335, 337, 338 TR: Guided Reading and Study Workbook: 11.2 LAB: Laboratory Manual: 91-96, 97-100; Small-Scale Lab Manual: Lab 15 TECH: Interactive Textbook with ChemASAP: Assessment: 11.2; Transparencies: T118-T120; www.SciLinks.org web code: cdn-1112, cdn-1114
3.2c Types of organic reactions include addition, substitution, polymerization, esterification, fermentation, saponification, and combustion.	SE/TE: 712, 728-729, 733-735, 742-745, 747-753, 776; Quick Lab: 746; Small-Scale Lab: 753 TE: Teacher Demo: 742, 744, 751 TR: Guided Reading and Study Workbook: 23.1, 23.2, 23.3, 23.4 LAB: Laboratory Manual: 299-304; Lab Practical: 23-1 TECH: Interactive Textbook with ChemASAP: Assessment: 23.1, 23.2, 23.3, 23.4; www.SciLinks.org web code: cdn-1233

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.2d An oxidation-reduction (redox) reaction involves the transfer of electrons (e-).	SE/TE: 633 TE: Teacher Demo: 632 TR: Guided Reading and Study Workbook: 20.1 LAB: Laboratory Manual: 275-278 TECH: Interactive Textbook with ChemASAP: Assessment: 20.1; www.SciLinks.org web code: cdn-1233
3.2e Reduction is the gain of electrons.	SE/TE: 633-635 TE: Teacher Demo: 632 TR: Guided Reading and Study Workbook: 20.1 LAB: Laboratory Manual: 275-278; Lab Practical: 20-1 TECH: Interactive Textbook with ChemASAP: Assessment: 20.1; www.SciLinks.org web code: cdn-1233
3.2f A half-reaction can be written to represent reduction.	SE/TE: 650-653; Small-Scale Lab: 655 TE: Teacher Demo: 640 TR: Guided Reading and Study Workbook: 20.3 LAB: Laboratory Manual: 275-278; Small-Scale Lab Manual: Lab 34 TECH: Interactive Textbook with ChemASAP: Assessment: 20.3; www.SciLinks.org web code: cdn-1233
3.2g Oxidation is the loss of electrons.	SE/TE: 633-635 TE: Teacher Demo: 632 TR: Guided Reading and Study Workbook: 20.1 LAB: Laboratory Manual: 275-278 TECH: Interactive Textbook with ChemASAP: Assessment: 20.1; www.SciLinks.org web code: cdn-1233
3.2h A half-reaction can be written to represent oxidation.	SE/TE: 650-653; Small-Scale Lab: 655 TE: Teacher Demo: 640 TR: Guided Reading and Study Workbook: 20.3 LAB: Laboratory Manual: 275-278; Small-Scale Lab Manual: Lab 34 TECH: Interactive Textbook with ChemASAP: Assessment: 20.3; www.SciLinks.org web code: cdn-1233

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.2i Oxidation numbers (states) can be assigned to atoms and ions. Changes in oxidation numbers indicate that oxidation and reduction have occurred.	SE/TE: 639-643; Small-Scale Lab: 655 TE: Class Activity: 641; Teacher Demo: 640 TR: Guided Reading and Study Workbook: 20.2 LAB: Laboratory Manual: 275-278; Small-Scale Lab Manual: Lab 34 TECH: Interactive Textbook with ChemASAP: Assessment: 20.2; Transparencies: T234-T237; www.SciLinks.org web code: cdn-1233
3.2j An electrochemical cell can be either voltaic or electrolytic. In an electrochemical cell, oxidation occurs at the anode and reduction at the cathode.	SE/TE: 665-666, 678-679 TE: Teacher Demo: 664, 667, 668 TR: Guided Reading and Study Workbook: 21.1, 21.3 LAB: Laboratory Manual: 287-290; Small-Scale Lab Manual: Lab 35 TECH: Interactive Textbook with ChemASAP: Assessment: 21.1, 21.3; Simulation: 21.27; www.SciLinks.org web code: cdn-1213
3.2k A voltaic cell spontaneously converts chemical energy to electrical energy.	SE/TE: 665 TE: Teacher Demo: 664, 667, 668 TR: Guided Reading and Study Workbook: 21.1 LAB: Small-Scale Lab Manual: Lab 35 TECH: Interactive Textbook with ChemASAP: Assessment: 21.1; Simulation: 21.27
3.2l An electrolytic cell requires electrical energy to produce a chemical change. This process is known as electrolysis.	SE/TE: 678-682; Small-Scale Lab: 684 TE: Teacher Demo: 680 TR: Guided Reading and Study Workbook: 21.3 LAB: Laboratory Manual: 287-290; Small-Scale Lab Manual: Lab 35; Lab Practical: 21-1 TECH: Interactive Textbook with ChemASAP: Assessment: 21.3; Transparencies: T250-T251; www.SciLinks.org web code: cdn-1213

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
PERFORMANCE INDICATOR 3.3	
Apply the principle of conservation of mass to chemical reactions.	SE/TE: 55, 325-327, 356-358; Inquiry Activity: 320, 352 TE: Teacher Demo: 327, 357 TR: Guided Reading and Study Workbook: 11.1, 12.1 LAB: Laboratory Manual: 121-126, 127-132; Small-Scale Lab Manual: Lab 15; Lab Practical: 12-1 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1, 12.1; Simulation: 12.6; Transparencies: T122-T125; www.SciLinks.org web code: cdn-1121
Major Understandings:	
3.3a In all chemical reactions there is a conservation of mass, energy, and charge.	SE/TE: 325, 356-358; Inquiry Activity: 320, 352; Writing Activity: 358 TE: Teacher Demo: 357 TR: Guided Reading and Study Workbook: 12.1 LAB: Laboratory Manual: 121-126 TECH: Interactive Textbook with ChemASAP: Assessment: 12.1; www.SciLinks.org web code: cdn-1121
3.3b In a redox reaction the number of electrons lost is equal to the number of electrons gained.	SE/TE: 647-648, 650-652; Small-Scale Lab: 655 TR: Guided Reading and Study Workbook: 20.3 LAB: Laboratory Manual: 275-278; Small-Scale Lab Manual: Lab 34 TECH: Interactive Textbook with ChemASAP: Assessment: 20.3; Transparencies: T238-T240; www.SciLinks.org web code: cdn-1233
3.3c A balanced chemical equation represents conservation of atoms. The coefficients in a balanced chemical equation can be used to determine mole ratios in the reaction.	SE/TE: 325-329, 353-358, 359-360; Inquiry Activity: 352 TE: Teacher Demo: 327, 357 TR: Guided Reading and Study Workbook: 11.1, 12.1, 12.2 LAB: Laboratory Manual: 121-126 TECH: Interactive Textbook with ChemASAP: Assessment: 11.1, 12.1, 12.2; www.SciLinks.org web code: cdn-1121

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.3d The empirical formula of a compound is the simplest whole-number ratio of atoms of the elements in a compound. It may be different from the molecular formula, which is the actual ratio of atoms in a molecule of that compound.	SE/TE: 309-312 TR: Guided Reading and Study Workbook: 10.3 LAB: Laboratory Manual: 85-90; Lab Practical: 10-1 TECH: Interactive Textbook with ChemASAP: Assessment: 10.3
3.3e The formula mass of a substance is the sum of the atomic masses of its atoms. The molar mass (gram-formula mass) of a substance equals one mole of that substance.	SE/TE: 293-296 TE: Class Activity: 295; Teacher Demo: 294 TR: Guided Reading and Study Workbook: 10.1 TECH: Interactive Textbook with ChemASAP: Assessment: 10.1; www.SciLinks.org web code: cdn-1104
3.3f The percent composition by mass of each element in a compound can be calculated mathematically.	SE/TE: 305-308; Quick Lab: 308 TE: Class Activity: 309 TR: Guided Reading and Study Workbook: 10.3 TECH: Interactive Textbook with ChemASAP: Assessment: 10.3; www.SciLinks.org web code: cdn-1103
PERFORMANCE INDICATOR 3.4	
Use kinetic molecular theory (KMT) to explain rates of reactions and the relationships among temperature, pressure, and volume of a substance.	SE/TE: 385-389, 413-417; Inquiry Activity: 384 TE: Class Activity: 388; Teacher Demo: 386, 387 TR: Guided Reading and Study Workbook: 13.1, 14.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1, 14.1; Transparencies: T139-T141, T150-T151; www.SciLinks.org web code: cdn-1131
Major Understandings:	
3.4a The concept of an ideal gas is a model to explain the behavior of gases. A real gas is most like an ideal gas when the real gas is at low pressure and high temperature.	SE/TE: 386-389, 428-429 TE: Teacher Demo: 386 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; Transparencies: T157; www.SciLinks.org web code: cdn-1131

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.4b Kinetic molecular theory (KMT) for an ideal gas states that all gas particles:	SE/TE: 385 TE: Class Activity: 388; Teacher Demo: 386 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131
• are in random, constant, straight-line motion.	SE/TE: 385-386 TE: Class Activity: 388 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131
• are separated by great distances relative to their size; the volume of the gas particles is considered negligible.	SE/TE: 385, 414 TE: Class Activity: 388 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131
• have no attractive forces between them.	SE/TE: 385-386 TE: Class Activity: 388; Teacher Demo: 386 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131
• have collisions that may result in a transfer of energy between gas particles, but the total energy of the system remains constant.	SE/TE: 385-386 TE: Class Activity: 388; Teacher Demo: 386 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131
3.4c Kinetic molecular theory describes the relationships of pressure, volume, temperature, velocity, and frequency and force of collisions among gas molecules.	SE/TE: 386-389, 414-417; Inquiry Activity: 384 TE: Class Activity: 388; Teacher Demo: 386, 387 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; www.SciLinks.org web code: cdn-1131

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.4d Collision theory states that a reaction is most likely to occur if reactant particles collide with the proper energy and orientation.	SE/TE: 541-544 TR: Guided Reading and Study Workbook: 18.1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1
3.4e Equal volumes of gases at the same temperature and pressure contain an equal number of particles.	SE/TE: 300-301, 303 TE: Teacher Demo: 301 TR: Guided Reading and Study Workbook: 10.2 LAB: Laboratory Manual: 79-84 TECH: Interactive Textbook with ChemASAP: Assessment: 10.2; Simulation 10.3
3.4f The rate of a chemical reaction depends on several factors: temperature, concentration, nature of the reactants, surface area, and the presence of a catalyst.	SE/TE: 545-547; Inquiry Activity: 540; Quick Lab: 544 TE: Teacher Demo: 546 TR: Guided Reading and Study Workbook: 18.1 LAB: Laboratory Manual: 225-230, 231-236; Small-Scale Lab Manual: Lab 28; Lab Practical: 18-1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1; Simulation: 18.24; www.SciLinks.org web code: cdn-1181
3.4g A catalyst provides an alternate reaction pathway, which has a lower activation energy than an uncatalyzed reaction.	SE/TE: 546-547 TE: Teacher Demo: 546 TR: Guided Reading and Study Workbook: 18.1 LAB: Laboratory Manual: 225-230; Small-Scale Lab Manual: Lab 28 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1; www.SciLinks.org web code: cdn-1181
3.4h Some chemical and physical changes can reach equilibrium.	SE/TE: 392, 550-551 TR: Guided Reading and Study Workbook: 18.2 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2; www.SciLinks.org web code: cdn-1182
3.4i At equilibrium the rate of the forward reaction equals the rate of the reverse reaction. The measurable quantities of reactants and products remain constant at equilibrium.	SE/TE: 392, 550-551 TR: Guided Reading and Study Workbook: 18.2 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2; www.SciLinks.org web code: cdn-1182

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
3.4j LeChatelier's principle can be used to predict the effect of stress (change in pressure, volume, concentration, and temperature) on a system at equilibrium.	SE/TE: 552-555 TE: Teacher Demo: 552, 555 TR: Guided Reading and Study Workbook: 18.2 LAB: Laboratory Manual: 237-242 TECH: Interactive Textbook with ChemASAP: Assessment: 18.2; Simulation: 18.24; www.SciLinks.org web code: cdn-1182
Key Idea 4: *Energy exists in many forms, and when these forms change energy is conserved*.	SE/TE: 505-507, 527-532; Quick Lab: 504; Small-Scale Lab: 533; Technology & Society: 518-519 TE: Class Activity: 508; Teacher Demo: 506, 530 TR: Guided Reading and Study Workbook: 17.1, 17.4 LAB: Laboratory Manual: 211-216, 217-224; Probeware Lab Manual: Heat of Combustion of a Candle; Lab Practical: Heat of Reaction TECH: Interactive Textbook with ChemASAP: Assessment: 17.1, 17.4; Transparencies: T180-T181
PERFORMANCE INDICATOR 4.1	
Observe and describe transmission of various forms of energy.	SE/TE: 520-526, 527-532; Quick Lab: 504; Small-Scale Lab: 533; Technology & Society: 518-519 TE: Class Activity: 522, 524, 525; Teacher Demo: 515, 523 TR: Guided Reading and Study Workbook: 17.3, 17.4 LAB: Laboratory Manual: 211-216, 217-224; Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice, Heat of Combustion of a Candle; Lab Practical: 17-2 TECH: Interactive Textbook with ChemASAP: Assessment: 17.3, 17.4; Animation 17.12; Transparencies: T187-T191, T192-T195; www.SciLinks.org web code: cdn-1171
Major Understandings:	
4.1a Energy can exist in different forms, such as chemical, electrical, electromagnetic, thermal, mechanical, nuclear.	SE/TE: 79, 505; Technology & Society: 518-519

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
4.1b Chemical and physical changes can be exothermic or endothermic.	SE/TE: 506-507, 764-765 TE: Teacher Demo: 506, 515 TR: Guided Reading and Study Workbook: 17.1 LAB: Small-Scale Lab Manual: Lab 26; Probeware Lab Manual: Heat of Fusion of Ice TECH: Interactive Textbook with ChemASAP: Assessment: 17.1
4.1c Energy released or absorbed during a chemical reaction can be represented by a potential energy diagram.	SE/TE: 543-544, 546-547 TR: Guided Reading and Study Workbook: 18.1 TECH: Interactive Textbook with ChemASAP: Assessment: 18.1; Transparencies: T196-T198
4.1d Energy released or absorbed during a chemical reaction (heat of reaction) is equal to the difference between the potential energy of the products and potential energy of the reactants. Explain heat in terms of kinetic molecular theory.	SE/TE: 514-517, 527-532 TE: Teacher Demo: 530 TR: Guided Reading and Study Workbook: 17.2 LAB: Laboratory Manual: 217-224; Lab Practical: 17-2 TECH: Interactive Textbook with ChemASAP: Assessment: 17.2; Transparencies: T192-T195; www.SciLinks.org web code: cdn-1174
PERFORMANCE INDICATOR 4.2	
4.2 Explain heat in terms of kinetic molecular theory.	SE/TE: 505 TECH: www.SciLinks.org web code: cdn-1131
Major Understandings:	
4.2a Heat is a transfer of energy (usually thermal energy) from a body of higher temperature to a body of lower temperature. Thermal energy is the energy associated with the random motion of atoms and molecules.	SE/TE: 77, 505; Inquiry Activity: 504 TE: Class Activity: 508 TR: Guided Reading and Study Workbook: 3.2, 17.1 TECH: Interactive Textbook with ChemASAP: Assessment: 3.2, 17.1
4.2b Temperature is a measurement of the average kinetic energy of the particles in a sample of material. Temperature is not a form of energy.	SE/TE: 77, 388-389 TR: Guided Reading and Study Workbook: 13.1 TECH: Interactive Textbook with ChemASAP: Assessment: 13.1; Animation: 13.9

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
4.2c The concepts of kinetic and potential energy can be used to explain physical processes that include: fusion (melting), solidification (freezing), vaporization (boiling, evaporation), condensation, sublimation, and deposition.	SE/TE: 391-395, 401, 520-524; Quick Lab 402, 522 TE: Class Activity: 393, 521; Teacher Demo: 392, 523 TR: Guided Reading and Study Workbook: 13.2, 17.3 LAB: Probeware Lab Manual: Heat of Fusion of Ice TECH: Interactive Textbook with ChemASAP: Assessment: 13.2, 17.3; Animation: 13.10; Transparencies: T142-T144; www.SciLinks.org web code: cdn-1131
PERFORMANCE INDICATOR 4.4	
Explain the benefits and risks of radioactivity.	SE/TE: 799-802, 806, 810-813; Technology & Society: 814-815 TE: Teacher Demo: 800 TR: Guided Reading and Study Workbook: 25.1, 25.3 LAB: Laboratory Manual: 311-317 TECH: Interactive Textbook with ChemASAP: Assessment: 25.1, 25.3; Transparencies: T294; www.SciLinks.org web code: cdn-1252, cdn-1254
Major Understandings:	
4.4a Each radioactive isotope has a specific mode and rate of decay (half-life).	SE/TE: 803-806; Inquiry Activity: 798; Small-Scale Lab Manual: 809 TR: Guided Reading and Study Workbook: 25.2 LAB: Laboratory Manual: 311-318 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2; Simulation: 25.30; www.SciLinks.org web code: cdn-1252
4.4b Nuclear reactions include natural and artificial transmutation, fission, and fusion.	SE/TE: 800-802, 803-804, 807-808, 810, 813 TR: Guided Reading and Study Workbook: 25.1, 25.2, 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2, 25.2, 25.3; Animation: 25.30; Simulation 25.30
4.4c Nuclear reactions can be represented by equations that include symbols which represent atomic nuclei (with mass number and atomic number), subatomic particles (with mass number and charge), and/or emissions such as gamma radiation.	SE/TE: 800-802, 803-804, 807-808, 810, 813 TR: Guided Reading and Study Workbook: 25.1, 25.2, 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2, 25.2, 25.3; Animation: 25.30; Simulation 25.30

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
4.4d Radioactive isotopes have many beneficial uses. Radioactive isotopes are used in medicine and industrial chemistry for radioactive dating, tracing chemical and biological processes, industrial measurement, nuclear power, and detection and treatment of diseases.	SE/TE: 805-806, 810-812, 816-819; Technology & Society: 814-815 TE: Teacher Demo: 800 TR: Guided Reading and Study Workbook: 25.2, 25.3, 25.4 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2, 25.3, 25.4; www.SciLinks.org web code: cdn-1252, cdn-1254
4.4e There are inherent risks associated with radioactivity and the use of radioactive isotopes. Risks can include biological exposure, long-term storage and disposal, and nuclear accidents.	SE/TE: 799, 812, 816 TR: Guided Reading and Study Workbook: 25.4 TECH: Interactive Textbook with ChemASAP: Assessment: 25.4; www.SciLinks.org web code: cdn-1254
4.4f There are benefits and risks associated with fission and fusion reactions.	SE/TE: 810-813 TR: Guided Reading and Study Workbook: 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.3; Animation 25.30
Key Idea 5: *Energy and matter interact through forces that result in changes in motion.*	SE/TE: 230-236, 391-395; Inquiry Activity: 100 TR: Guided Reading and Study Workbook: 8.3 TECH: Interactive Textbook with ChemASAP: Assessment: 8.3
PERFORMANCE INDICATOR 5.2	
Explain chemical bonding in terms of the behavior of electrons.	SE/TE: 230-236, 391-395; Inquiry Activity: 100 TR: Guided Reading and Study Workbook: 8.3 TECH: Interactive Textbook with ChemASAP: Assessment: 8.3
Major Understandings:	
5.2a Chemical bonds are formed when valence electrons are:	SE/TE: 187-205, 213-214, 217-229, 230-236; Inquiry Activity: 212 TE: Class Activity: 220 TR: Guided Reading and Study Workbook: 8.1, 8.2, 8.3 TECH: Interactive Textbook with ChemASAP: Assessment: 8.1, 8.2, 8.3; www.SciLinks.org web code: cdn-1072, cdn-1081, cdn-1083

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
• transferred from one atom to another (ionic)	SE/TE: 194-196 TR: Guided Reading and Study Workbook: 7.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2; www.SciLinks.org web code: cdn-1092
• shared between atoms (covalent)	SE/TE: 217-225, 228-229 TE: Class Activity: 218, 220; Teacher Demo: 228 TR: Guided Reading and Study Workbook: 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 8.2; Simulation: 8.16; Transparencies: T90-T92; www.SciLinks.org web code: cdn-1081
• mobile within a metal (metallic)	SE/TE: 189-193 TE: Class Activity: 190 TR: Guided Reading and Study Workbook: 7.1 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1; Transparencies: T76-T78
5.2b Atoms attain a stable valence electron configuration by bonding with other atoms. Noble gases have stable valence configurations and tend not to bond.	SE/TE: 188, 194-195, 217-220 TE: Class Activity: 190, 220 TR: Guided Reading and Study Workbook: 7.1, 7.2, 8.2 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1, 7.2, 8.2
5.2c When an atom gains one or more electrons, it becomes a negative ion and its radius increases. When an atom loses one or more electrons, it becomes a positive ion and its radius decreases.	SE/TE: 176, 188-193 TE: Class Activity: 190 TR: Guided Reading and Study Workbook: 6.3, 7.1 TECH: Interactive Textbook with ChemASAP: Assessment: 6.3, 7.1
5.2d Electron-dot diagrams (Lewis structures) can represent the valence electron arrangement in elements, compounds, and ions.	SE/TE: 188-193, 196, 217-225, 227-229 TE: Class Activity: 190, 218, 220 TR: Guided Reading and Study Workbook: 7.1, 8.2 LAB: Small-Scale Lab Manual: Lab 10 TECH: Interactive Textbook with ChemASAP: Assessment: 7.1, 8.2; Transparencies: T75-T78; www.SciLinks.org web code: cdn-1072, cdn-1081

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
5.2e In a multiple covalent bond, more than one pair of electrons are shared between two atoms. Unsaturated organic compounds contain at least one double or triple bond.	SE/TE: 221-222, 702-703 TR: Guided Reading and Study Workbook: 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 8.2
5.2f Some elements exist in two or more forms in the same phase. These forms differ in their molecular or crystal structure, and hence in their properties.	SE/TE: 398-399 TR: Guided Reading and Study Workbook: 13.3 LAB: Laboratory Manual: 133-138 TECH: Interactive Textbook with ChemASAP: Assessment: 13.3; www.SciLinks.org web code: cdn-1085, cdn-1133
5.2g Two major categories of compounds are ionic and molecular (covalent) compounds.	SE/TE: 194-195, 217 TE: Class Activity: 197 TR: Guided Reading and Study Workbook: 7.2, 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2, 8.2; www.SciLinks.org web code: cdn-1072, cdn-1081
5.2h Metals tend to react with nonmetals to form ionic compounds. Nonmetals tend to react with other nonmetals to form molecular (covalent) compounds. Ionic compounds containing polyatomic ions have both ionic and covalent bonding.	SE/TE: 188, 194, 213-214, 217, 223-225 TR: Guided Reading and Study Workbook: 7.2, 8.2 TECH: Interactive Textbook with ChemASAP: Assessment: 7.2, 8.2; Simulation: 8.16; www.SciLinks.org web code: cdn-1072, cdn-1081
5.2i When a bond is broken, energy is absorbed. When a bond is formed, energy is released.	SE/TE: 226, 786-787 TR: Guided Reading and Study Workbook: 24.6 TECH: Interactive Textbook with ChemASAP: Assessment: 24.6
5.2j Electronegativity indicates how strongly an atom of an element attracts electrons in a chemical bond. Electronegativity values are assigned according to arbitrary scales.	SE/TE: 238-239 TE: Class Activity: 238 TR: Guided Reading and Study Workbook: 8.4 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4; www.SciLinks.org web code: cdn-1063

NEW YORK CORE CURRICULUM, PHYSICAL SETTING/ CHEMISTRY CORE CURRICULUM	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
5.2k The electronegativity difference between two bonded atoms is used to assess the degree of polarity in the bond.	SE/TE: 238-239 TE: Class Activity: 238 TR: Guided Reading and Study Workbook: 8.4 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4; www.SciLinks.org web code: cdn-1063
5.2l Molecular polarity can be determined by the shape of the molecule and distribution of charge. Symmetrical (nonpolar) molecules include CO2, CH4, and diatomic elements. Asymmetrical (polar) molecules include HCl, NH3, and H2O.	SE/TE: 239-240 TE: Teacher Demo: 240 TR: Guided Reading and Study Workbook: 8.4 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4; Animation: 8.19
5.2m Intermolecular forces created by the unequal distribution of charge result in varying degrees of attraction between molecules. Hydrogen bonding is an example of a strong intermolecular force.	SE/TE: 240-241, 243-244, 446-447; Inquiry Activity: 444 TE: Teacher Demo: 243 TR: Guided Reading and Study Workbook: 8.4, 15.1 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4, 15.1; Animation 15.20, 15.21; www.SciLinks.org web code: cdn-1084
5.2n Physical properties of substances can be explained in terms of chemical bonds and intermolecular forces. These properties include conductivity, malleability, solubility, hardness, melting point, and boiling point.	SE/TE: 243-244 TE: Teacher Demo: 240, 243 TR: Guided Reading and Study Workbook: 8.4 TECH: Interactive Textbook with ChemASAP: Assessment: 8.4; Animation: 13.11, 8.19; Transparencies; www.SciLinks.org web code: cdn-1084
PERFORMANCE INDICATOR 5.3	
Compare energy relationships within an atom's nucleus to those outside the nucleus.	SE/TE: 104-107 TR: Guided Reading and Study Workbook: 4.2 TECH: Interactive Textbook with ChemASAP: Assessment: 4.2

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Major Understandings:	
5.3a A change in the nucleus of an atom that converts it from one element to another is called transmutation. This can occur naturally or can be induced by the bombardment of the nucleus with high-energy particles.	SE/TE: 803-804, 807-808 TE: Teacher Demo: 817 TR: Guided Reading and Study Workbook: 25.2 LAB: Laboratory Manual: 311-318 TECH: Interactive Textbook with ChemASAP: Assessment: 25.2; Simulation: 25.30; Transparencies: T289-T292
5.3b Energy released in a nuclear reaction (fission or fusion) comes from the fractional amount of mass that is converted into energy. Nuclear changes convert matter into energy.	SE/TE: 810, 813 TE: Teacher Demo: 811 TR: Guided Reading and Study Workbook: 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.3; Animation 25.30
5.3c Energy released during nuclear reactions is much greater than the energy released during chemical reactions.	SE/TE: 810, 813 TE: Teacher Demo: 811 TR: Guided Reading and Study Workbook: 25.3 TECH: Interactive Textbook with ChemASAP: Assessment: 25.3; Animation 25.30

Reference: http://www.emsc.nysed.gov/ciai/mst/pub/chemist.pdf