

# ***Active Chemistry* Correlations to the Next Generation Science Standards**

The page numbers in this correlation represent each chapter in which students are being prepared to meet the *NGSS Performance Expectations* and the Reading/Writing Standards for Literacy in Science and Technical Subjects.

## Scientific and Engineering Practices

Practices:	<i>Active Chemistry</i> Location:
1. Asking questions (for science) and defining problems (for engineering)	<p>Chapter 1 - Chapter Challenge, pp. 2-6, 87-89                      Chapter 2 - Chapter Challenge, pp. 96-98, 187-189                      Chapter 3 - Chapter Challenge, pp. 196-198, 267-269                      Chapter 4 - Chapter Challenge, pp. 276-278, 369-371                      Chapter 5 - Chapter Challenge, pp. 378-380, 453-455                      Chapter 6 - Chapter Challenge, pp. 462-464, 539-541                      Chapter 7 - Chapter Challenge, pp. 548-550, 631-633                      Chapter 8 - Chapter Challenge, pp. 640-642, 719-721</p>
2. Developing and using models	<p>Making use of models to develop deeper understanding of difficult concepts is emphasized throughout <i>Active Chemistry</i>. The "Investigate" sections have students creating physical models to illustrate events they can not see. The "Chem Essential Questions" offers metacognitive strategies to help students gain a deeper understanding of the concepts they just learned. Students are asked to create symbolic structures or models to explain a chemical phenomenon.</p> <p>Chapter 1 - 8-10, 17, 22-25, 31, 34-35, 37, 40-41, 44, 48-51, 57, 60-62, 65, 68-69, 71, 73-74, 76, 78-80, 83                      Chapter 2 - 99-100, 101-104, 107, 109-112, 117, 120-122, 127, 129-132, 136-137, 140-144, 150, 152-156, 159, 162-164, 168, 171-175, 183                      Chapter 3 - 200, 202-204, 211, 213-215, 219, 221-223, 228, 230-234, 239, 244-247, 250, 253-256, 259, 261-262, 264,                      Chapter 4 - 280-282, 287, 290-293, 295, 298-302, 307, 311-315, 319, 324-325, 330, 332-335, 339, 342-344, 350, 353-356, 364                      Chapter 5 - 381-384, 387, 389-392, 395, 397-399, 404, 407-410, 414, 418-420, 426, 429-432, 434, 436-438, 442, 445-446, 449-450                      Chapter 6 - 465-467, 470-471, 473-476, 478, 480-483, 488, 490-494, 498, 502-503, 508, 511-513, 516, 519-522, 529, 532-533, 536                      Chapter 7 - 551-553, 559, 562-564, 569, 572-575, 580, 584-585, 589, 591-594, 597, 600-602, 605, 608-609, 612-613, 615-621, 627                      Chapter 8 - 643-644, 647, 649-652, 656, 658-660, 665, 668-672, 678, 682-684, 688, 691-693, 698, 700-703, 707, 709-712, 715</p>
3. Planning and carrying out investigations	<p>Students conduct investigations, analyze and interpret data, and present multiple potential solutions through inquiry based processes during the "Investigate" sections. Students connect the new information they are learning to what they already know.</p> <p>Chapter 1 - 8-10, 22-25, 34-35, 40-41, 48-51, 60-62, 68-69, 73-74, 78-80                      Chapter 2 - 99-100, 101-104, 109-112, 120-122, 129-132, 140-144, 152-156, 162-164, 171-175                      Chapter 3 - 200, 202-204, 213-215, 221-223, 230-234, 244-247, 253-256, 261-262                      Chapter 4 - 280-282, 290-293, 298-302, 311-315, 324-325, 332-335, 342-344, 353-356                      Chapter 5 - 381-384, 389-392, 397-399, 407-410, 418-420, 429-432, 436-438, 445-446                      Chapter 6 - 465-467, 473-476, 480-483, 490-494, 502-503, 511-513, 519-522, 532-533                      Chapter 7 - 551-553, 562-564, 572-575, 584-585, 591-594, 600-602, 608-609, 615-621                      Chapter 8 - 643-644, 649-652, 658-660, 668-672, 682-684, 691-693, 700-703, 709-712</p>
4. Analyzing and interpreting data	<p>Throughout <i>Active Chemistry</i>, students have multiple opportunities to analyze and interpret data and develop strong evidence to validate their findings. To complete the "Chapter Challenge," students are encouraged to rely on one another as a resource of information and design ideas.</p> <p>Chapter 1 - 8-10, 22-25, 34-35, 40-41, 48-51, 60-62, 68-69, 73-74, 78-80                      Chapter 2 - 99-100, 101-104, 109-112, 120-122, 129-132, 140-144, 152-156, 162-164, 171-175                      Chapter 3 - 200, 202-204, 213-215, 221-223, 230-234, 244-247, 253-256, 261-262                      Chapter 4 - 280-282, 290-293, 298-302, 311-315, 324-325, 332-335, 342-344, 353-356                      Chapter 5 - 381-384, 389-392, 397-399, 407-410, 418-420, 429-432, 436-438, 445-446                      Chapter 6 - 465-467, 473-476, 480-483, 490-494, 502-503, 511-513, 519-522, 532-533                      Chapter 7 - 551-553, 562-564, 572-575, 584-585, 591-594, 600-602, 608-609, 615-621                      Chapter 8 - 643-644, 649-652, 658-660, 668-672, 682-684, 691-693, 700-703, 709-712</p>

5. Using mathematics and computational thinking	<p><i>Active Chemistry</i> challenges students mathematical and computational thinking as they analyze data within each "Investigate" activity. (Examples: pp. 48-51, 109-112, 129-132, 230-234, 289-293, 600-602.) The "Chem Talk" feature requires students to analyze graphs, data charts, equations and diagrammatic models to develop conceptual understanding of the content. The "Chem To Go" and "Practice Tests" provides students with practice in mathematical skills.</p> <p>Chapter 1 - 11-15, 19-20, 26-30, 32-33, 36-37, 38-39, 42-43, 45, 52-56, 58-59, 63-64, 66, 70, 72, 75, 77, 80-82, 84, 92-94  Chapter 2 - 100, 105-106, 108, 113-116, 118-119, 123-126, 127-128, 133-136, 137, 144-149, 151, 157-158, 160-161, 165-167, 169-170, 176-182, 184-185, 192-194  Chapter 3 - 201, 204-210, 212, 216-218, 220, 224-227, 229, 235-238, 240-241, 248-249, 251-252, 256-258, 260, 262-263, 265, 272-274  Chapter 4 - 283-286, 288, 294, 296-297, 303-307, 308-310, 316-318, 320-321, 326-329, 331, 336-338, 340-341, 345-349, 351-352, 357-363, 365-367, 374-376  Chapter 5 - 384-386, 388, 392-395, 396, 400-403, 405, 411-413, 415, 421-425, 427-428, 432-433, 435, 438-441, 443, 447-448, 450-451, 458-460  Chapter 6 - 468-470, 471-472, 476-477, 479, 483-487, 489, 495-497, 499, 504, 507, 509, 514-515, 517-518, 522-528, 530, 534-535, 537, 544-546  Chapter 7 - 554-558, 560-561, 564-568, 570-571, 575-579, 581, 586-588, 590, 595-596, 598-599, 603-604, 606-607, 610-612, 613-614, 622-626, 628-629, 636-638  Chapter 8 - 644-646, 648, 652-655, 657, 661-664, 666-667, 672-677, 678-679, 685-687, 689, 693-697, 698-699, 704-708, 712-714, 716, 724-726</p>
6. Constructing explanations (for science) and designing solutions (for engineering)	<p>Chapter 1 - Chapter Challenge, pp. 2-6, 87-89  Chapter 2 - Chapter Challenge, pp. 96-98, 187-189  Chapter 3 - Chapter Challenge, pp. 196-198, 267-269  Chapter 4 - Chapter Challenge, pp. 276-278, 369-371  Chapter 5 - Chapter Challenge, pp. 378-380, 453-455  Chapter 6 - Chapter Challenge, pp. 462-464, 539-541  Chapter 7 - Chapter Challenge, pp. 548-550, 631-633  Chapter 8 - Chapter Challenge, pp. 640-642, 719-721</p>
7. Engaging in argument from evidence	<p>Chapter 1 - Chapter Challenge, pp. 2-6, 87-89  Chapter 2 - Chapter Challenge, pp. 96-98, 187-189  Chapter 3 - Chapter Challenge, pp. 196-198, 267-269  Chapter 4 - Chapter Challenge, pp. 276-278, 369-371  Chapter 5 - Chapter Challenge, pp. 378-380, 453-455  Chapter 6 - Chapter Challenge, pp. 462-464, 539-541  Chapter 7 - Chapter Challenge, pp. 548-550, 631-633  Chapter 8 - Chapter Challenge, pp. 640-642, 719-721</p>
8. Obtaining, evaluating, and communicating information	<p>In every <i>Chapter</i>, the "Chapter Challenge" and "Chapter Mini-Challenge" culminate with a public presentation and communication of ideas, findings, data, and recommendations. Students present their ideas and scientific findings with the use of a poster, chart, diagram, model, play, or skit.</p> <p>Chapter 1 - Chapter Challenge and Chapter Mini-Challenge, pp. 2-6, 46-47, 87-89  Chapter 2 - Chapter Challenge and Chapter Mini-Challenge, pp. 96-98, 138-139, 187-189  Chapter 3 - Chapter Challenge and Chapter Mini-Challenge, pp. 196-198, 242-243, 267-269  Chapter 4 - Chapter Challenge and Chapter Mini-Challenge, pp. 276-278, 322-323, 369-371  Chapter 5 - Chapter Challenge and Chapter Mini-Challenge, pp. 378-380, 416-417, 453-455  Chapter 6 - Chapter Challenge and Chapter Mini-Challenge, pp. 462-464, 500-501, 539-541  Chapter 7 - Chapter Challenge and Chapter Mini-Challenge, pp. 548-550, 582-583, 631-633  Chapter 8 - Chapter Challenge and Chapter Mini-Challenge, pp. 640-642, 680-681, 719-721</p>

## Crosscutting Concepts

Concepts:	<i>Active Chemistry</i> Location:
1. Patterns	<p>Throughout <i>Active Chemistry</i>, students explore similarities and diversity in natural events and observable phenomenon. For example in Chapter 2, "Fun with the Periodic Table," students use data from investigations and information from scientific reading to group elements by their properties and construct evidence for the organization of the periodic table. While Chapter 4, "Chemical Dominoes," reinforces the concept of patterns in our natural world by helping students develop the ability to predict which chemical reactions will occur, which won't, and how energy will be used.</p> <p>Chapter 2 - pp. 101- 104, 140-151, 152-156, 162-170            Chapter 3 - pp. 202-204, 213-215, 221-223, 244-247            Chapter 4 - pp. 280-283, 289-302, 311-315, 332-337, 342-346            Chapter 5 - pp. 381-384, 407-410, 418-420            Chapter 8 - pp. 643-644, 649-652, 658-660</p>
2. Cause and effect	<p><i>Active Chemistry</i> provides multiple opportunities for students to explore how the events of the natural world have understandable causes at several size and time scales. For example Chapter 5, "Ideal Toy," helps deepen student understanding of cause and effect by examining the relationship of temperature, pressure, and volume of gases. Also Chapter 6, "Cool Chemistry Show," re-enforces the understanding of cause and effect by developing the concepts of reaction rates, oxidation, and reduction.</p> <p>Chapter 2 - pp. 190A-B            Chapter 3 - pp. 270A-B            Chapter 4 - pp. 311-318, 332-338, 372A-B            Chapter 5 - pp. 381-384, pp. 397-399, 407-411, 429-432, 456A            Chapter 6 - pp. 511-513, 519-527, 532-537, 542A-B            Chapter 7 - pp. 562-567, 584-596, 608-612, 634A-B            Chapter 8 - pp. 722A-B</p>
3. Scale, proportion, and quantity	<p>The concept of scale, proportion, and quantity is emphasized throughout <i>Active Chemistry</i> as students deepen their understanding of time, size, energy, ratios, and the mathematical relationship between disparate events. Students explore a sense of relative size, the very large and very small, and the scale of change over time. Chapter 4, "Chemical Dominoes," provides examples of scale proportion and quantity as students explore stoichiometry, electrochemical cells, and energy transfer in chemical equations.</p> <p>Chapter 1 - pp. 22-29, 48-52            Chapter 2 - pp. 129-137            Chapter 4 - pp. 279-282, 289-294, 298-310, 332-338            Chapter 5 - pp. 397-403, 407-413, 418-428, 429-435            Chapter 6 - pp. 511-516            Chapter 7 - pp. 572-581, 584-588, 600-605            Chapter 8 - pp. 649-657</p>
4. Systems and system models	<p>Students develop the ability to organize related groups of objects or events into interactions within the whole and analyze the forces acting on the system as well as matter and energy flowing through the system.</p> <p>Chapter 1 - 34-37, 78-82            Chapter 2 - 99-100, 120-126, 162-167, 171-182            Chapter 3 - 244-250            Chapter 4 - 298-307, 332-338, 353-363            Chapter 5 - 381-387            Chapter 6 - 519-528            Chapter 7 - 572-579, 608-612            Chapter 8 - 643-646</p>

5. Energy and matter	<p>Students gain the ability to examine and model the transfer of energy throughout <i>Active Chemistry</i>. Inputs, outputs, flows, and transfers of energy are examined in systems at various time and size scales. Chapter 7, "Cookin' Chem," focuses student attention on energy and energy transfer as they prepare to complete the "Chapter Challenge."</p> <p>Chapter 4 - pp. 279-282, 324-330, 332-338, 342-344, 353-363  Chapter 5 - pp. 407-413, 436-441, 502-510, 511-515  Chapter 7 - pp. 551-559, 562-569, 572-581, 584-590, 591-599, 600-607, 608-614</p>
6. Structure and function	<p>Understanding the function of natural and built systems depends on the shapes and relationships of its parts as well as the properties of component material. Chapter 2, "Fun with the Periodic Table," provides an introduction to structure and function at the atomic level as students explore the properties of matter at the macro, micro, and nano scale.</p> <p>Chapter 2 - pp. 109-119, 120-126, 129-136, 140-150, 152-159, 162-168, 171-182  Chapter 3 - pp. 213-220, 253-260  Chapter 4 - pp. 324-330  Chapter 5 - pp. 381-386, 389-395, 444-449  Chapter 7 - pp. 608, 615-621  Chapter 8 - pp. 658-664, 709-714</p>
7. Stability and change	<p>Stability and change of natural systems over small and long time scales and macro and micro size scales is explored throughout <i>Active Chemistry</i>. Students are provided examples of feedback mechanisms that drive instability or control equilibrium as they deepen their understanding of this concept.</p> <p>Chapter 1 - pp. 22-29  Chapter 2 - pp. 129-137, 138-139, 171-185  Chapter 3 - pp. 230-238  Chapter 4 - pp. 279-286, 311-318, 324-329, 353-361  Chapter 5 - pp. 389-394  Chapter 6 - pp. 465-470, 473-479, 480-487, 532-537  Chapter 7 - pp. 584-588, 608-612  Chapter 8 - pp. 668-677</p>

## Performance Expectations

Expectations:	Active Chemistry Location:
HS. Structure and Properties	
HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	Chapter 1 - pp. 63-65, 73-76 Chapter 2 - pp. 99-106, 120-136, 140-170 Chapter 3 - pp. 213-229, 244-250, 261-264 Chapter 4 - pp. 311-321 Chapter 5 - pp. 381-387 Chapter 6 - pp. 480-488, 519-537 Chapter 8 - pp. 643-648, 691-699
HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	Chapter 1 - pp. 22-32, 40-44 Chapter 2 - pp. 140-145 Chapter 3 - pp. 213-215, 224-227, 244-250 Chapter 4 - pp. 289-295 Chapter 5 - pp. 381-404, 418-423 Chapter 6 - pp. 473-497, 519-522 Chapter 7 - pp. 584-598 Chapter 8 - pp. 668-699
HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	Chapter 2 - pp. 171-183
HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*	Chapter 1 - pp. 45, 63, 67-72, 78-83, 90 Chapter 3 - pp. 224-226, 241, 253-258 Chapter 4 - pp. 353-365, 372-372B Chapter 5 - pp. 381-387, 444-451 Chapter 6 - pp. 470 Chapter 7 - pp. 615-627 Chapter 8 - pp. 658-665, 700-715
Expectations:	Active Chemistry Location:
HS. Chemical Reactions	
HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	Chapter 1 - pp. 8-10, 71 Chapter 2 - pp. 101-106, 162-170 Chapter 3 - pp. 202-219, 224-227, 244-250, 261-265 Chapter 4 - pp. 298-309, 311-318 Chapter 5 - pp. 381-387, 436-441 Chapter 6 - pp. 465-470, 473-488, 490-498, 519-537 Chapter 8 - pp. 658-665, 668-689, 700-708
HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.	Chapter 1 - pp. 8-10, 71 Chapter 2 - pp. 101-106, 162-170 Chapter 3 - pp. 202-219-, 224-227, 244-250, 261-265 Chapter 4 - pp. 298-309, 311-318 Chapter 5 - pp. 381-387, 436-441 Chapter 6 - pp. 465-488, 490-498, 519-537 Chapter 8 - pp. 658-665, 668-689, 700-708

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	Chapter 4 - pp. 332-351 Chapter 5 - pp. 429-435 Chapter 6 - pp. 472, 511-518
HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.*	Chapter 4 - pp. 279-284, 310, 332-335, 341 Chapter 5 - pp. 429-435
HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Chapter 1 - pp. 14-17, 80-83 Chapter 3 - pp. 230-238, 244-250 Chapter 4 - pp. 290-295, 298-309 Chapter 5 - pp. 418-426, 429-434 Chapter 6 - pp. 490-498 Chapter 8 - pp. 691-699
<b>Expectations:</b>	<b>Active Chemistry Location:</b>
HS. Forces and Interactions	
HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	Preparation to meet this Performance Expectation can be found in <i>Active Physics</i> .
HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.	Preparation to meet this Performance Expectation can be found in <i>Active Physics</i> .
HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*	Preparation to meet this Performance Expectation can be found in <i>Active Physics</i> .
HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	Chapter 2 - pp. 123-126
HS-PS2-5. Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	Chapter 2 - pp. 120-122
<b>Expectations:</b>	<b>Active Chemistry Location:</b>
HS. Energy	
HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	Chapter 1 - pp. 22-25 Chapter 2 - pp. 129-137 Chapter 4 - pp. 332-339, 342-350 Chapter 6 - pp. 502-503, 542A-B Chapter 7 - pp. 551-558, 572-580, 591-599, 600-607
HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).	Chapter 1 - pp. 22-25, 28-29 Chapter 2 - pp. 123-126, 129-137, 161 Chapter 3 - pp. 213-218 Chapter 5 - pp. 389-395, 397-403, 407-413 Chapter 7 - pp. 551-558, 591-599

HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*	Chapter 4 - pp. 279-287, 311-315, 332-339, 342-350 Chapter 5 - pp. 381-384 Chapter 6 - pp. 502-503 Chapter 7 - pp. 551-558, 591-599
HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	Chapter 4 - pp. 342-350, 353-367 Chapter 6 - pp. 502-510 Chapter 7 - pp. 551-558, 572-575, 591-594, 600-607
HS-PS3-5. Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.	Chapter 2 - pp. 120-127, 171-183 Chapter 5 - pp. 392-394
<b>Expectations:</b>	<b>Active Chemistry Location:</b>
HS. Waves and Electromagnetic Radiation:	
HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	Chapter 4 - pp. 324-330
HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.	n/a
HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.	Chapter 2 - pp. 120-128, 129-137 Chapter 4 - pp. 324-330
HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	Chapter 2 - pp. 129-137, 190A-B Chapter 4 - pp. 324-330
HS-PS4-5. Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.*	Preparation to meet this Performance Expectation can be found in <i>EarthComm</i> .



Expectations:	<i>Active Chemistry</i> Location:
HS. Engineering Design	
HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	Chapter 3 - pp. 208-212, 270A-B Chapter 6 - pp. 542A-B
HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	Chapter 1 - pp. 2-6, 87-89 Chapter 2 - pp. 138-139 Chapter 4 - pp. 276-278, 322-323, 367 Chapter 5 - pp. 378-380 Chapter 6 - pp. 462-464 Chapter 7 - pp. 548-550 Chapter 8 - pp. 640-642
HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	Chapter 1 - pp. 87-89 Chapter 2 - pp. 138-139, 187-189 Chapter 3 - pp. 242-243, 267-269 Chapter 4 - pp. 322-323, 369-371 Chapter 5 - pp. 416-417, 453-455 Chapter 6 - pp. 500-501, 539-541 Chapter 7 - pp. 582-583, 631-633 Chapter 8 - pp. 680-681, 719-721
HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	n/a

## Reading Standards for Literacy in Science and Technical Subjects: Grades 11-12

Standards:	<i>Active Chemistry</i> Location:
Key Ideas and Details	
1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	<p>Every chapter in <i>Active Chemistry</i> provides students an opportunity to analyze science and technical concepts by citing evidence from their reading. The "What Do You Think Now," "Chem Essential Questions," and "Chem to Go" sections promote student understanding of the informational text.</p> <p>Chapter 1 - pp. 16-17, 19-20, 31-33, 37-39, 43-45, 57-59, 65-66, 71-72, 76-77, 83-84            Chapter 2 - pp. 100, 106-108, 117-119, 127-128, 136-137, 149-151, 158-161, 168-170, 183-185            Chapter 3 - pp. 201, 210-212, 219-220, 227-229, 239-241, 250-252, 258-260, 264-265            Chapter 4 - pp. 286-288, 294-297, 307-310, 318-321, 329-331, 338-341, 349-352, 364-367            Chapter 5 - pp. 386-388, 395-396, 403-405, 413-415, 426-428, 434-435, 441-443, 449-451            Chapter 6 - pp. 470-472, 477-479, 487-489, 498-499, 507-509, 515-518, 528-531, 535-537            Chapter 7 - pp. 559-561, 569-571, 580-581, 589-590, 597-599, 605-607, 612-614, 627-629            Chapter 8 - pp. 646-648, 655-657, 665-667, 677-679, 688-689, 697-699, 706-708, 715-716</p>
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	<p>Students determine the central ideas of informational text by answering the "Checking Up" questions in the "Chem Talk" section. These questions support the learning goals of each section and promote student understanding of the informational text.</p> <p>Chapter 1 - pp. 15, 30, 37, 43, 56, 64, 70, 75, 82            Chapter 2 - pp. 106, 116, 126, 135, 149, 158, 167, 182            Chapter 3 - pp. 210, 218, 227, 238, 249, 258, 263            Chapter 4 - pp. 286, 294, 306, 318, 329, 338, 349, 363            Chapter 5 - pp. 386, 395, 403, 413, 425, 433, 441, 448            Chapter 6 - pp. 470, 477, 487, 497, 507, 515, 528, 535            Chapter 7 - pp. 558, 568, 578, 588, 596, 604, 612, 626            Chapter 8 - pp. 646, 654, 664, 677, 687, 697, 706, 714</p>
3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	<p>Chapter 1 - pp. 7-21, 22-33, 34-39, 40-45, 48-59, 60-67, 68-72, 73-77, 78-85            Chapter 2 - pp. 101-108, 129-137            Chapter 3 - pp. 202-212, 213-220, 221-229, 230-241, 244-252, 253-260, 261-265            Chapter 4 - pp. 289-297, 298-310, 311-321, 324-331, 332-341, 342-352, 353-367            Chapter 5 - pp. 381-388, 397-406, 407-415, 418-428, 429-435, 436-443, 444-451            Chapter 6 - pp. 465-472, 473-479, 490-499, 519-531, 532-537            Chapter 7 - pp. 551-561, 562-571, 572-581, 584-590, 591-599, 600-607, 608-614, 615-629            Chapter 8 - pp. 649-657, 658-667, 668-679, 682-690, 691, 699, 700-708, 709-717</p>
Craft and Structure	
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to Grades 11-12 texts and topics.	<p>Key scientific and technical terms and domain specific words, or "Chem Words," are highlighted in the "Chem Talk" sections to promote student development of academic vocabulary.</p> <p>Chapter 1 - pp. 12-14, 26-29, 36, 42-43, 52, 63-64, 70, 75, 80-82            Chapter 2 - pp. 105-106, 113-114, 116, 123-125, 133-134, 144-146, 148-149, 158, 165-167, 176-181            Chapter 3 - pp. 204-206, 209, 216, 218, 224-225, 235-237, 248-249, 256-258            Chapter 4 - pp. 285-286, 294, 303-304, 306, 316-317, 326, 328-329, 336-337, 345, 347-349, 357, 359, 361, 363            Chapter 5 - pp. 384-385, 392-394, 400-402, 411-412, 421-425, 432-433, 439-440, 447-448            Chapter 6 - pp. 468-470, 476-477, 483-486, 495-497, 504-507, 514-515, 522-525, 527, 534            Chapter 7 - pp. 554-556, 564-565, 568, 576-577, 579, 586-588, 595, 603-604, 610-611, 622-626            Chapter 8 - pp. 644-646, 652-654, 661-664, 672-676, 685, 687, 694-696, 704-706, 712-714</p>

<p>5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p>	<p>Every chapter provides students an opportunity to analyze the central ideas of informational text and demonstrate understanding of the ideas. The "Checking Up" questions in the "Chem Talk" section promotes student feedback on understanding and clarification of important ideas.</p> <p>Chapter 1 - pp. 15, 30, 37, 43, 56, 64, 70, 75, 82  Chapter 2 - pp. 106, 116, 126, 135, 149, 158, 167, 182  Chapter 3 - pp. 210, 218, 227, 238, 249, 258, 263  Chapter 4 - pp. 286, 294, 306, 318, 329, 338, 349, 363  Chapter 5 - pp. 386, 395, 403, 413, 425, 433, 441, 448  Chapter 6 - pp. 470, 477, 487, 497, 507, 515, 528, 535  Chapter 7 - pp. 558, 568, 578, 588, 596, 604, 612, 626  Chapter 8 - pp. 646, 654, 664, 677, 687, 697, 706, 714</p>
<p>6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p>	<p>At the conclusion of each learning section is "What Do You Think Now?," "Chem Essential Questions," and "Reflecting on the Section and the Challenge." These sections provide an opportunity for students to analyze their learning, discuss their investigations, summarize the important concepts, create an explanation for the natural phenomenon they have observed in the section and identify important information they still need to meet the "Chapter Challenge."</p> <p>Chapter 1 - pp. 16-18, 31-32, 37-38, 43-44, 57-58, 65-66, 71, 76-77, 83-84  Chapter 2 - pp. 100, 106-107, 117-118, 127, 136-137, 149-150, 158-160, 168, 183-184  Chapter 3 - pp. 210-211, 219-220, 227-228, 239-240, 250-251, 258-259, 264-265  Chapter 4 - pp. 286-287, 294-296, 307-308, 318-320, 329-330, 338-339, 349-351, 364-365  Chapter 5 - pp. 386-387, 395-396, 403-404, 413-414, 426-427, 434-435, 441-442, 449-450  Chapter 6 - pp. 470-471, 477-478, 487-488, 498-499, 507-508, 515-516, 528-529, 535-536  Chapter 7 - pp. 559-560, 569-570, 580, 589-590, 597-598, 605-606, 612-613, 627-628  Chapter 8 - pp. 646-647, 655-656, 665-666, 677-678, 688, 697-698, 706-707, 715-716</p>
<p>Integration of Knowledge and Ideas</p>	
<p>7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>	<p>Quantitative data, diagrams, simulations, and demonstrations are used extensively throughout <i>Active Chemistry</i> in the "Investigate" sections to help students visually understand complex concepts..</p> <p>Chapter 1 - 8-10, 22-25, 34-35, 40-41, 48-51, 60-62, 68-69, 73-74, 78-80  Chapter 2 - 99-100, 101-104, 109-112, 120-122, 129-132, 140-144, 152-156, 162-164, 171-175  Chapter 3 - 200, 202-204, 213-215, 221-223, 230-234, 244-247, 253-256, 261-262  Chapter 4 - 280-282, 290-293, 298-302, 311-315, 324-325, 332-335, 342-344, 353-356  Chapter 5 - 381-384, 389-392, 397-399, 407-410, 418-420, 429-432, 436-438, 445-446  Chapter 6 - 465-467, 473-476, 480-483, 490-494, 502-503, 511-513, 519-522, 532-533  Chapter 7 - 551-553, 562-564, 572-575, 584-585, 591-594, 600-602, 608-609, 615-621  Chapter 8 - 643-644, 649-652, 658-660, 668-672, 682-684, 691-693, 700-703, 709-712</p>
<p>8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p>	<p>Throughout <i>Active Chemistry</i>, students investigate science concepts and observable phenomenon. In each case they gather and analyze data, form conclusions based on their hypothesis or predictions, and corroborate their findings with others in the class as well as their readings of science and technical text. Examples of supporting activities and readings can be found in every chapter.</p> <p>Chapter 1 - pp. 7-21, 22-33, 34-39, 40-45, 48-59, 60-67, 68-72, 73-77, 78-85  Chapter 2 - pp. 101-108, 129-137  Chapter 3 - pp. 202-212, 213-220, 221-229, 230-241, 244-252, 253-260, 261-265  Chapter 4 - pp. 289-297, 298-310, 311-321, 324-331, 332-341, 342-352, 353-367  Chapter 5 - pp. 381-388, 397-406, 407-415, 418-428, 429-435, 436-443, 444-451  Chapter 6 - pp. 465-472, 473-479, 490-499, 519-531, 532-537  Chapter 7 - pp. 551-561, 562-571, 572-581, 584-590, 591-599, 600-607, 608-614, 615-629  Chapter 8 - pp. 649-657, 658-667, 668-679, 682-690, 691, 699, 700-708, 709-717</p>

<p>9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>	<p>In <i>Active Chemistry</i>, students investigate science concepts and observable phenomenon. They gather and analyze data from investigations and simulations, form conclusions based on their hypothesis or predictions, and corroborate their findings with others in the class as well as their readings of science and technical text. Examples of supporting activities and readings can be found in every chapter.</p> <p>Chapter 1 - pp. 7-21, 22-33, 34-39, 40-45, 48-59, 60-67, 68-72, 73-77, 78-85  Chapter 2 - pp. 101-108, 129-137  Chapter 3 - pp. 202-212, 213-220, 221-229, 230-241, 244-252, 253-260, 261-265  Chapter 4 - pp. 289-297, 298-310, 311-321, 324-331, 332-341, 342-352, 353-367  Chapter 5 - pp. 381-388, 397-406, 407-415, 418-428, 429-435, 436-443, 444-451  Chapter 6 - pp. 465-472, 473-479, 490-499, 519-531, 532-537  Chapter 7 - pp. 551-561, 562-571, 572-581, 584-590, 591-599, 600-607, 608-614, 615-629  Chapter 8 - pp. 649-657, 658-667, 668-679, 682-690, 691, 699, 700-708, 709-717</p>
<p>Range of Reading and Level of Text Complexity</p>	
<p>10. By the end of Grade 12, read and comprehend science/technical texts in the Grades 11-CCR text complexity band independently and proficiently.</p>	<p>"Chem Talk" is found within every <i>Section</i> of <i>Active Chemistry</i> and it promotes academic language and reading proficiency as students encounter increasingly complex informational text.</p> <p>Chapter 1 - pp. 11-15, 26-30, 36-37, 42-43, 52-56, 63-64, 70-75, 80-82  Chapter 2 - pp. 105-106, 113-116, 123-126, 133-136, 144-149, 157-158, 165-167, 176-182  Chapter 3 - pp. 204-210, 216-218, 224-227, 235-238, 248-249, 256-258, 262-263  Chapter 4 - pp. 283-286, 294, 303-307, 316-318, 326-329, 336-338, 345-349, 357-363  Chapter 5 - pp. 384-386, 392-395, 400-403, 411-413, 421-425, 432-433, 438-441, 447-448  Chapter 6 - pp. 468-470, 476-477, 483-487, 495-497, 504-507, 514-515, 522-528, 534-535  Chapter 7 - pp. 554-558, 564-568, 575-579, 586-588, 595-596, 603-604, 610-612, 622-626  Chapter 8 - pp. 644-646, 652-655, 661-664, 672-677, 685-687, 693-697, 704-706, 712-714</p>

## Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects: Grades 11-12

Standards:	<i>Active Chemistry</i> Location:
Text Types and Purposes	
1. Write arguments focused on discipline-specific content.	Students write content specific text when completing the "Chapter Challenge," "Investigate," "Checking Up," "Preparing for the Chapter Challenge," "Chapter Mini-Challenge," "Understanding and Applying," and "Inquiring Further" features in each <i>Section</i> . In their work, students develop claims, use content specific vocabulary, provide evidence, and generate concluding statements.
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	Students write informative/explanatory text containing domain specific language, transitions, and proper formatting when completing the "Chapter Challenge," "Preparing for the Chapter Challenge," "Chapter Mini-Challenge," and "Inquiring Further" sections. Students use domain specific vocabulary ("Chem Words") in their <i>Active Chemistry Logs</i> to present information, explanations, and answers to the "Investigate," "Checking Up," and "Understanding and Applying" sections.
3. Not applicable as a separate requirement.	N/A
Production and Distribution of Writing	
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	<p>Every chapter provides students with an opportunity to increase their writing skills using domain-specific vocabulary and diverse techniques to convey understanding of a topic. The "Checking Up" questions require students to respond in complete sentences using academic language to explain new knowledge. The "Chem to Go" questions offers critical thinking and offers students with more challenging writing opportunities to show knowledge of complex topics.</p> <p>Chapter 1 - pp. 15, 19-20, 30, 32-33, 37, 38-39, 43, 45, 56, 58-59, 64, 66, 70, 72, 75, 77, 82, 84                      Chapter 2 - pp. 106, 108, 116, 118-119, 126, 127-128, 135, 137, 149, 151, 158, 160-161, 167, 169-170, 182, 184-185                      Chapter 3 - pp. 201, 210, 212, 218, 220, 227, 229, 238, 240-241, 249, 251-252, 258, 260, 263, 265                      Chapter 4 - pp. 286, 288, 294, 296-297, 306, 308-310, 318, 320-321, 329, 331, 338, 340-341, 349, 351-352, 363, 365-367                      Chapter 5 - pp. 386, 388, 395, 403, 405, 413, 425, 427-428, 433, 435, 441, 443, 448, 450-451                      Chapter 6 - pp. 470, 471-475, 477, 479, 487, 489, 497, 499, 507, 509, 515, 517-518, 528, 530, 535, 537                      Chapter 7 - pp. 558, 560-561, 568, 570-571, 578, 581, 588, 590, 596, 598-599, 604, 606-607, 612, 613-614, 626, 628-629                      Chapter 8 - pp. 646, 648, 654, 657, 664, 666-667, 677, 678-679, 687-689, 697, 698-699, 706, 707-708, 714, 716</p>
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	<p>At the conclusion of each <i>Section</i> is "What Do You Think Now?," "Chem Essential Questions," and "Reflecting on the Section and the Challenge." These provide an opportunity for students to revisit their earlier thinking, rewrite previous statements, discuss their investigations, summarize the important concepts, create a revised explanation for the natural phenomenon they have observed, and identify important information they still need to meet the "Chapter Challenge."</p> <p>Chapter 1 - pp. 16-18, 31-32, 37-38, 43-44, 57-58, 65-66, 71, 76-77, 83-84                      Chapter 2 - pp. 100, 106-107, 117-118, 127, 136-137, 149-150, 158-160, 168, 183-184                      Chapter 3 - pp. 210-211, 219-220, 227-228, 239-240, 250-251, 258-259, 264-265                      Chapter 4 - pp. 286-287, 294-296, 307-308, 318-320, 329-330, 338-339, 349-351, 364-365                      Chapter 5 - pp. 386-387, 395-396, 403-404, 413-414, 426-427, 434-435, 441-442, 449-450                      Chapter 6 - pp. 470-471, 477-478, 487-488, 498-499, 507-508, 515-516, 528-529, 535-536                      Chapter 7 - pp. 559-560, 569-570, 580, 589-590, 597-598, 605-606, 612-613, 627-628                      Chapter 8 - pp. 646-647, 655-656, 665-666, 677-678, 688, 697-698, 706-707, 715-716</p>
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	The use of the Internet is not required for <i>Active Chemistry</i> . However, the Internet can enhance and deepen a student's experience and is often used to complete the "Inquiring Further" section. Examples can be found: pp. 85, 128, 252, 406, 510, 581, 679

Research to Build and Present Knowledge	
<p>7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>	<p>At the end of a <i>Section</i>, students have the opportunity to develop a sustained research project, create a self-generated question, or solve a problem in "Inquiring Further."</p> <p>Chapter 1 - pp. 20, 33, 39, 45, 59, 67, 72, 77, 85            Chapter 2 - pp. 128, 161, 170, 185            Chapter 3 - pp. 201, 212, 220, 229, 241, 252, 260            Chapter 4 - pp. 310, 321, 331, 341, 352, 367            Chapter 5 - pp. 388, 406, 415, 428, 443, 451            Chapter 6 - pp. 472, 510, 518, 531, 537            Chapter 7 - pp. 561, 571, 581, 614            Chapter 8 - pp. 648, 657, 667, 679, 690, 699, 708</p>
<p>8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>	<p>To complete each "Chapter Challenge," students must construct explanations about the physical phenomenon's and events observed. Students integrate information from various sources, investigations, readings, and their peers to prepare their presentations. They create posters, PowerPoints, charts, graphs, skits, and plays to illustrate their recommendations, findings, ideas, and claims.</p> <p>Chapter 1 - Chapter Mini-Challenge and Chapter Challenge, pp. 46-47, 87-88            Chapter 2 - Chapter Mini-Challenge and Chapter Challenge, pp. 138-139, 187-189            Chapter 3 - Chapter Mini-Challenge and Chapter Challenge, pp. 242-243, 267-269            Chapter 4 - Chapter Mini-Challenge and Chapter Challenge, pp. 322-323, 369-371            Chapter 5 - Chapter Mini-Challenge and Chapter Challenge, pp. 416-417, 453-455            Chapter 6 - Chapter Mini-Challenge and Chapter Challenge, pp. 500-501, 539-541            Chapter 7 - Chapter Mini-Challenge and Chapter Challenge, pp. 582-583, 631-633            Chapter 8 - Chapter Mini-Challenge and Chapter Challenge, pp. 680-681, 719-721</p>
<p>9. Draw evidence from informational texts to support analysis, reflection, and research.</p>	<p>At the conclusion of each Section is "What Do You Think Now?," "Chem Essential Questions," and "Reflecting on the Section and the Challenge." These provide an opportunity for students to draw evidence from their investigations and informational text, summarize important concepts, create revised explanation for the natural phenomenon they have observed, and identify important information they still need to meet the chapter challenge.</p> <p>Chapter 1 - pp. 16-18, 31-32, 37-38, 43-44, 57-58, 65-66, 71, 76-77, 83-84            Chapter 2 - pp. 100, 106-107, 117-118, 127, 136-137, 149-150, 158-160, 168, 183-184            Chapter 3 - pp. 210-211, 219-220, 227-228, 239-240, 250-251, 258-259, 264-265            Chapter 4 - pp. 286-287, 294-296, 307-308, 318-320, 329-330, 338-339, 349-351, 364-365            Chapter 5 - pp. 386-387, 395-396, 403-404, 413-414, 426-427, 434-435, 441-442, 449-450            Chapter 6 - pp. 470-471, 477-478, 487-488, 498-499, 507-508, 515-516, 528-529, 535-536            Chapter 7 - pp. 559-560, 569-570, 580, 589-590, 597-598, 605-606, 612-613, 627-628            Chapter 8 - pp. 646-647, 655-656, 665-666, 677-678, 688, 697-698, 706-707, 715-716</p>

Range of Writing

10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Every chapter provides students an opportunity to increase their skills in writing. The "Checking Up" and the "Chem to Go" questions require students to respond in complete sentences using academic language to explain new knowledge.

- Chapter 1 - pp. 15, 19-20, 30, 32-33, 37, 38-39, 43, 45, 56, 58-59, 64, 66, 70, 72, 75, 77, 82, 84
- Chapter 2 - pp. 106, 108, 116, 118-119, 126, 127-128, 135, 137, 149, 151, 158, 160-161, 167, 169-170, 182, 184-185
- Chapter 3 - pp. 201, 210, 212, 218, 220, 227, 229, 238, 240-241, 249, 251-252, 258, 260, 263, 265
- Chapter 4 - pp. 286, 288, 294, 296-297, 306, 308-310, 318, 320-321, 329, 331, 338, 340-341, 349, 351-352, 363, 365-367
- Chapter 5 - pp. 386, 388, 395, 403, 405, 413, 425, 427-428, 433, 435, 441, 443, 448, 450-451
- Chapter 6 - pp. 470, 471-475, 477, 479, 487, 489, 497, 499, 507, 509, 515, 517-518, 528, 530, 535, 537
- Chapter 7 - pp. 558, 560-561, 568, 570-571, 578, 581, 588, 590, 596, 598-599, 604, 606-607, 612, 613-614, 626, 628-629
- Chapter 8 - pp. 646, 648, 654, 657, 664, 666-667, 677, 678-679, 687-689, 697, 698-699, 706, 707-708, 714, 716

The sections "What Do You Think Now?," "Chem Essential Questions," and "Reflecting on the Section and the Challenge" provide an opportunity for students to write over an extended period of time as they revisit their earlier thinking, rewrite previous statements, discuss their investigations, summarize the important concepts or create a revised explanation for the natural phenomenon they have observed within that *Section*.

- Chapter 1 - pp. 16-18, 31-32, 37-38, 43-44, 57-58, 65-66, 71, 76-77, 83-84
- Chapter 2 - pp. 100, 106-107, 117-118, 127, 136-137, 149-150, 158-160, 168, 183-184
- Chapter 3 - pp. 210-211, 219-220, 227-228, 239-240, 250-251, 258-259, 264-265
- Chapter 4 - pp. 286-287, 294-296, 307-308, 318-320, 329-330, 338-339, 349-351, 364-365
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- Chapter 7 - pp. 559-560, 569-570, 580, 589-590, 597-598, 605-606, 612-613, 627-628
- Chapter 8 - pp. 646-647, 655-656, 665-666, 677-678, 688, 697-698, 706-707, 715-716