

Active Physical Science Correlations to the Next Generation Science Standards: High School, Physical Science

The page numbers listed represent each unit 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 Physical Science</i> Location:
1. Asking questions (for science) and defining problems (for engineering)	<p>The practice of asking questions is used extensively throughout Active Physical Science. The product of each Chapter Challenge is unique, requires imagination and creativity and is guided by student constructed questions and student defined problems.</p> <p>Chapter 1 - Chapter Challenge, pp. 2-7, 120-121 Chapter 2 - Chapter Challenge, pp. 128-131, 208-209 Chapter 3 - Chapter Challenge, pp. 216-219, 344-345 Chapter 4 - Chapter Challenge, pp. 352-355, 460-461 Chapter 5 - Chapter Challenge, pp. 468-470, 559-561 Chapter 6 - Chapter Challenge, pp. 568-570, 643-645 Chapter 7 - Chapter Challenge, pp. 652-654, 729-731</p>
2. Developing and using models	<p>Making use of models to develop deeper understanding of difficult concepts is emphasized throughout Active Physical Science. The Investigate sections have students creating physical or diagrammatic models to help illustrate events that are difficult to observe directly.</p> <p>Chapter 1 - pp. 34-51-52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 149-163, 176-181, 182-192, 193-205 Chapter 3 - pp. 244-253, 264-275, 278-291, 320-329 Chapter 4 - pp. 364-371, 372-380, 381-388, 422-435, 436-448 Chapter 5 - pp. 481-491, 492-500, 524-533, 534-542 Chapter 6 - pp. 579-586, 587-596, 597-605, 608-618, 626-633, 634-641 Chapter 7 - pp. 692-700, 701-708, 722-727</p> <p>The Essential Questions, found at the end of each chapter, 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 chemical phenomenon. (Examples can be found on pp. 501-509, 579-586, 608-618, 634-641, and 670-679.)</p>
3. Planning and carrying out investigations	<p>In order to complete the Chapter Challenge, students must conduct investigations and present multiple potential solutions through inquiry based processes. Students conduct investigations, analyze and interpret data, and connect the new information they are learning to what they already know.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 364-371, 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 473-480, 501-509 Chapter 6 - pp. 571-578, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</p>
4. Analyzing and interpreting data	<p>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 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 364-371, 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 473-480, 501-509 Chapter 6 - pp. 571-578, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</p>

<p>5. Using mathematics and computational thinking</p>	<p>Active Physical Science challenges students mathematical and computational thinking as they analyze data within each Investigate activity. (Examples: pp. 22-33, 34-51, 75-89.) The Physics/Chem Talk feature requires students to analyze graphs, data charts, equations and diagrammatic models to develop conceptual understanding of the content.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 149-163, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 481-491, 501-509 Chapter 6 - pp. 587-596, 597-605, 619-625, 626-633 Chapter 7 - pp. 655-662, 692-700, 709-721</p>
<p>6. Constructing explanations (for science) and designing solutions (for engineering)</p>	<p>To complete the Chapter Challenge, students must construct explanations about physical phenomenon based on their investigative findings and scientific reading.</p> <p>Chapter 1 - Chapter Challenge and Chapter Mini-Challenge, pp. 2-7, 72-74, 120-121 Chapter 2 - Chapter Challenge and Chapter Mini-Challenge, pp. 128-131, 174-175, 208-209 Chapter 3 - Chapter Challenge and Chapter Mini-Challenge, pp. 216-219, 276-277, 344-345 Chapter 4 - Chapter Challenge and Chapter Mini-Challenge, pp. 352-355, 420-421, 460-461 Chapter 5 - Chapter Challenge and Chapter Mini-Challenge, pp. 468-470, 510-511, 559-561 Chapter 6 - Chapter Challenge and Chapter Mini-Challenge, pp. 568-570, 606-607, 643-645 Chapter 7 - Chapter Challenge and Chapter Mini-Challenge, pp. 652-654, 690-691, 729-731</p> <p>In Preparing for the Chapter Challenge students use these claims with evidence to deepen their understanding of observable events. The Essential Questions feature asks students to describe, using evidence "What do you know?" and "Why do you believe?." In each case students must make a statement of their knowledge citing evidence to support their claim.</p>
<p>7. Engaging in argument from evidence</p>	<p>To complete the Chapter Challenge, students must construct explanations about physical phenomenon based on their investigative findings and scientific reading.</p> <p>Chapter 1 - Chapter Challenge and Chapter Mini-Challenge, pp. 2-7, 72-74, 120-121 Chapter 2 - Chapter Challenge and Chapter Mini-Challenge, pp. 128-131, 174-175, 208-209 Chapter 3 - Chapter Challenge and Chapter Mini-Challenge, pp. 216-219, 276-277, 344-345 Chapter 4 - Chapter Challenge and Chapter Mini-Challenge, pp. 352-355, 420-421, 460-461 Chapter 5 - Chapter Challenge and Chapter Mini-Challenge, pp. 468-470, 510-511, 559-561 Chapter 6 - Chapter Challenge and Chapter Mini-Challenge, pp. 568-570, 606-607, 643-645 Chapter 7 - Chapter Challenge and Chapter Mini-Challenge, pp. 652-654, 690-691, 729-731</p> <p>In Preparing for the Chapter Challenge students use these claims with evidence to deepen their understanding of observable events. The Essential Questions feature asks students to describe, using evidence "What do you know?" and "Why do you believe?." In each case students must make a statement of their knowledge citing evidence to support their claim.</p>
<p>8. Obtaining, evaluating, and communicating information</p>	<p>In every chapter, 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. 2-7, 72-74, 120-121 Chapter 2 - Chapter Challenge and Chapter Mini-Challenge, pp. 128-131, 174-175, 208-209 Chapter 3 - Chapter Challenge and Chapter Mini-Challenge, pp. 216-219, 276-277, 344-345 Chapter 4 - Chapter Challenge and Chapter Mini-Challenge, pp. 352-355, 420-421, 460-461 Chapter 5 - Chapter Challenge and Chapter Mini-Challenge, pp. 468-470, 510-511, 559-561 Chapter 6 - Chapter Challenge and Chapter Mini-Challenge, pp. 568-570, 606-607, 643-645 Chapter 7 - Chapter Challenge and Chapter Mini-Challenge, pp. 652-654, 690-691, 729-731</p>

Crosscutting Concepts

Concepts:	<i>Active Physical Science</i> Location:
1. Patterns	<p>Throughout Active Physical Science, students explore similarities and diversity in natural events and observable phenomenon. Fun with the Periodic Table, Ideal Toy, and Driving the Roads focus on patterns in our natural world.</p> <p>Chapter 1 - pp. 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 182-192 Chapter 3 - pp. 232-243, 244-253, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 364-371, 372-380, 402-419, 422-435 Chapter 5 - pp. 471-472, 473-480, 481-491, 492-500, 501-509, 512-523, 524-533, 534-542 Chapter 6 - pp. 579-586, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 663-669, 680-689, 701-708</p>
2. Cause and effect	<p>Active Physical Science provides multiple opportunities for students to explore how the events of the natural world have understandable causes at several size and time scales. Cause and effect is a primary concept found in Driving the Roads, Safety, and Thrills and Chills.</p> <p>Chapter 1 - pp. 8-21, 34-51, 52-71, 90-104, 105-117 Chapter 2 - pp. 132-137, 138-148, 149-163, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 372-380, 381-388, 389-401, 422-435 Chapter 5 - pp. 512-523, 534-542, 543-557 Chapter 6 - pp. 579-586, 597-605, 619-625, 626-633 Chapter 7 - pp. 663-669, 692-700, 701-708, 722-727</p>
3. Scale, proportion, and quantity	<p>The concept of scale, proportion, and quantity is emphasized throughout Active Physical Science 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.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 149-163, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 481-491, 492-500, 501-509, 512-523, 534-542, 543-557 Chapter 6 - pp. 579-586, 587-596, 608-618, 619-625, 626-633 Chapter 7 - pp. 663-669, 680-689, 692-700, 701-708, 709-721, 722-727</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 - pp. 34-51, 52-71, 75-89, 90-104 Chapter 2 - pp. 138-148, 149-163, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 320-329 Chapter 4 - pp. 356-363, 364-371, 381-388, 389-401, 402-419, 422-435, 436-448 Chapter 5 - pp. 471-472, 473-480, 492-500, 501-509, 512-523, 524-533, 534-542, 543-557 Chapter 6 - pp. 571-578, 579-586, 587-596, 597-605, 619-625, 626-633 Chapter 7 - pp. 655-662, 663-669, 670-679, 680-689, 692-700, 709-721, 722-727</p>

5. Energy and matter	<p>Students gain the ability to examine and model the transfer of energy throughout Active Physical Science. Inputs, outputs, flows, and transfers of energy are examined in systems at various time and size scales.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 132-137, 138-148, 149-163, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 364-371, 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 501-509, 512-523, 534-542, 543-557 Chapter 6 - pp. 571-578, 579-586, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 663-669, 680-689, 692-700, 701-708, 722-727</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. Fun with the Periodic Table and Electricity for Everyone provide a particularly rich exposure to this concept as students explore atomic structure and electrical circuits.</p> <p>Chapter 1 - pp. 75-89 Chapter 2 - pp. 138-148, 149-163 Chapter 3 - pp. 244-253 Chapter 4 - pp. 356-363, 372-380, 381-388, 389-401, 402-419 Chapter 5 - pp. 481-491, 492-500, 501-509, 512-523, 524-533, 534-542, 543-557 Chapter 6 - pp. 579-586, 626-633, 634-641 Chapter 7 - pp. 709-721, 722-727</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 Active Physical Science. 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. 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 3 - pp. 220-231, 244-253, 254-263, 264-275, 278-291, 292-307, 320-329 Chapter 4 - pp. 364-371, 372-380, 381-388, 402-419, 422-435, 436-448 Chapter 5 - pp. 512-523, 534-542, 543-557 Chapter 6 - pp. 579-586, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 701-708, 722-727</p>

Performance Expectations

Expectations:	Active Physical Science Location:
HS. Structure and Properties of Matter	
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 5 - pp. 471-472, 473-480, 481-491, 492-500, 501-509, 512-523, 524-533, 534-542, 543-557 Chapter 6 - pp. 626-633, 634-641 Chapter 7 - pp. 670-679, 722-727
HS-PS1-3. Plan and carry out investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	Chapter 5 - pp. 512-517 Chapter 6 - pp. 571-594, 608-613 Chapter 7 - pp. 663-687, 709-712
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 5 - pp. 543-555
HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*	Chapter 6 - pp. 571-577, 634-641 Chapter 7 - p. 660
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 6 - pp. 571-577, 626-631 Chapter 7 - pp. 655-660, 663-678, 680-688, 709-727
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 6 - pp. 571-577, 626-631 Chapter 7 - pp. 655-678, 680-688, 709-727
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 6 - pp. 619-625 Chapter 7 - pp. 663, 701-708
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 6 - pp. 619-625
HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Chapter 6 - pp. 608-616, 619-625 Chapter 7 - pp. 680-688

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.	Chapter 2 - pp. 164-173 Chapter 3 - pp. 278-291
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.	Chapter 2 - pp. 176-181, 182-192
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.*	Chapter 2- pp. 193-205
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 3 - pp. 254-263 Chapter 5 - pp. 495-498
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 5 - pp. 492-494
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 2 - pp. 149-163 Chapter 3 - pp. 232-243 Chapter 4 - pp. 436-448 Chapter 5 - pp. 501-509 Chapter 7 - pp. 692-693, 732A-B
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 4 - pp. 422-435 Chapter 5 - pp. 495-498, 501-509, 533 Chapter 6 - pp. 579-585, 587-593, 597-603
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 3 - pp. 330-341 Chapter 4 - pp. 436-448, 449-457 Chapter 6 - pp. 571-574 Chapter 7 - pp. 692-693
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. 422-435 Chapter 7 - pp. 692-700
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 3 - pp. 320-329 Chapter 5 - pp. 492-499, 543-555 Chapter 6 - pp. 582-584

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.	
HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.	
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 particles model, and that for some situations one model is more useful than the other.	Chapter 5 - pp. 492-500, 501-509
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 5 - pp. 501-509, 562A-B
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 EarthComm .
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 1 - pp. 2-7, 72-74, 120-121 Chapter 2 - pp. 128-131, 174-175, 208-209 Chapter 3 - pp. 216-219, 276-277, 344-345 Chapter 4 - pp. 352-355, 420-421 Chapter 7 - pp. 732A-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. 2-7, 72-74, 120-121 Chapter 2 - pp. 128-131, 174-175, 208-209 Chapter 3 - pp. 216-219, 276-277, 344-345 Chapter 4 - pp. 352-355, 420-421 Chapter 5 - pp. 510-511 Chapter 6 - pp. 568-570 Chapter 7 - pp. 652-654
HS-ETS1-3. Evaluate a solution 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 2 - pp. 128-131, 174-175 Chapter 3 - pp. 216-219, 276-277 Chapter 5 - pp. 510-511, 559-561 Chapter 6 - pp. 606-607, 643-645 Chapter 7 - pp. 690-691, 729-731
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.	

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

Standards:	Active Physical Science Location:
Key Ideas and Details	
<p>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>	<p>Every chapter in the Active Physical Science program provides students an opportunity to analyze science and technical concepts by citing evidence from reading. The What Do You Think Now?, Physics/Chem Essential Questions, and Physics/Chem to Go sections support the learning goals of each section and promote student understanding of the informational text.</p> <p>Chapter 1 - pp. 16-17, 19-20, 30-32, 48-51, 66-71, 86-89, 101-104, 112-115 Chapter 2 - pp. 136-137, 144-147, 160, 162-163, 170-171, 179-181, 189-192, 203-205 Chapter 3 - pp. 228-231, 241-243, 250-253, 261-263, 272-275, 289-291, 303-307, 316-319, 327-329, 338-341 Chapter 4 - pp. 360-363, 369-371, 377-380, 385-388, 398-401, 414-419, 433-435, 442-447, 454-457 Chapter 5 - pp. 472, 478-480, 489-491, 499-500, 508-509, 521-523, 530-533, 540-542, 555-557 Chapter 6 - pp. 576-578, 585-586, 593-595, 603-605, 616-618, 624-625, 631-633, 639-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</p>
<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>	<p>The Active Physical Science program provides ample opportunity for students to determine the central ideas of information text by including a Checking Up section. These questions support the learning goals of each section and promote student understanding of the informational text.</p> <p>Chapter 1 - pp. 13, 28, 46, 64, 82, 100, 110 Chapter 2 - pp. 135, 143, 159, 169, 179, 187, 201 Chapter 3 - pp. 226, 239, 249, 259, 271, 287, 301, 314, 325, 336 Chapter 4 - pp. 359, 368, 376, 384, 396, 412, 430, 440, 453 Chapter 5 - pp. 478, 488, 498, 507, 521, 530, 539, 554 Chapter 6 - pp. 576, 585, 593, 603, 615, 623, 631, 638 Chapter 7 - pp. 660, 667, 677, 687, 697, 705, 718, 725</p>
<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>	<p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 473-480, 501-509 Chapter 6 - pp. 571-578, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</p>
Craft and Structure	
<p>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>	<p>Key scientific and technical terms and domain specific words are highlighted in the informational text of the Active Physical Science program to promote student development of academic vocabulary.</p> <p>Chapter 1 - pp. 12, 25-26, 37-46, 58-63, 78, 109-110 Chapter 2 - pp. 140-142, 151-152, 166-167, 178, 185, 196-198 Chapter 3 - pp. 225-226, 235-237, 247, 257-258, 268-271, 297-298, 311-314 Chapter 4 - pp. 358, 367-368, 375-376, 383, 391-393, 424-430, 452-453 Chapter 5 - pp. 477-478, 485-488, 495-497, 505-506, 516-521, 530, 537-539, 548-553 Chapter 6 - pp. 574-575, 582-584, 590-592, 601-602, 611-615, 622-623, 629-630, 637-638 Chapter 7 - pp. 658-660, 666-667, 673-676, 685-687, 694-697, 704-705, 712-717, 724</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 in the Active Physical Science program provides students an opportunity to analyze the central ideas of informational text and demonstrate understanding of the ideas. The Checking Up section promotes student feedback on understanding and clarification of the important ideas. These questions support the learning goals of each section and promote student understanding of the informational text.</p> <p>Chapter 1 - pp. 13, 28, 46, 64, 82, 100, 110 Chapter 2 - pp. 135, 143, 159, 169, 179, 187, 201 Chapter 3 - pp. 226, 239, 249, 259, 271, 287, 301, 314, 325, 336 Chapter 4 - pp. 359, 368, 376, 384, 396, 412, 430, 440, 453 Chapter 5 - pp. 478, 488, 498, 507, 521, 530, 539, 554 Chapter 6 - pp. 576, 585, 593, 603, 615, 623, 631, 638 Chapter 7 - pp. 660, 667, 677, 687, 697, 705, 718, 725</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?, Reflecting on the Section and the Challenge, and Physics/Chem Essential Questions. 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 observe in the section and identify important information they still need to meet the Chapter Challenge.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 473-480, 501-509 Chapter 6 - pp. 571-578, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</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 the Active Physical Science program to help students visually understand complex concepts.</p> <p>Chapter 1 - pp. 22-33, 34-51, 52-71, 75-89, 90-104, 105-117 Chapter 2 - pp. 138-148, 164-173, 176-181, 182-192, 193-205 Chapter 3 - pp. 232-243, 244-253, 254-263, 264-275, 278-291, 292-307, 308-319, 320-329 Chapter 4 - pp. 372-380, 381-388, 389-401, 402-419, 422-435, 436-448, 449-457 Chapter 5 - pp. 473-480, 501-509 Chapter 6 - pp. 571-578, 587-596, 597-605, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 680-689, 709-721, 722-727</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>The Physic/Chem Talk sections are found in every Learning Section of the Active Physical Science program and promote student development of academic language and reading proficiency as they encounter increasingly complex informational text.</p> <p>Chapter 1 - pp. 12-13, 25-28, 37-46, 58-64, 78-82, 98-100, 109-110 Chapter 2 - pp. 135, 140-143, 151-159, 166-169, 178-179, 184-187, 196-201 Chapter 3 - pp. 225-226, 235-239, 246-249, 257-259, 268-271, 282-287, 297-301, 311-314, 322-325, 332-336 Chapter 4 - pp. 358-359, 367-368, 375-376, 383-384, 391-396, 404-412, 424-430, 438-440, 451-453 Chapter 5 - pp. 477-478, 485-488, 495-498, 505-507, 516-521, 529-530, 537-539, 548-554 Chapter 6 - pp. 574-576, 582-585, 590-593, 601-603, 611-615, 622-623, 628631, 637-638, Chapter 7 - pp. 658-660, 666-667, 673-677, 685-687, 694-697, 704-705, 712-718, 724-725</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>To complete each Chapter Challenge, in the Active Physical Science program, students must construct explanations about physical phenomenon based on their investigative findings and scientific reading.</p> <p>Chapter 1 - Chapter Challenge, pp. 2-7, 120-121 Chapter 2 - Chapter Challenge, pp. 128-131, 208-209 Chapter 3 - Chapter Challenge, pp. 216-219, 344-345 Chapter 4 - Chapter Challenge, pp. 352-355, 460-461 Chapter 5 - Chapter Challenge, pp. 468-470, 559-561 Chapter 6 - Chapter Challenge, pp. 568-570, 643-645 Chapter 7 - Chapter Challenge, pp. 652-654, 729-731</p> <p>In Preparing for the Chapter Challenge students use these claims, with evidence, to deepen their understanding of observable events. The Physics/Chem Essential Questions asks students to describe, using evidence from "What Do You Know?" and "Why Do You Believe?." In each case, students must make a statement of their knowledge citing evidence to support their statement.</p> <p>Chapter 1 - pp. 16-17, 31, 48, 67, 87, 102, 113 Chapter 2 - pp. 136, 145, 160, 170, 180, 190, 203 Chapter 3 - pp. 229, 241, 251, 262, 273, 289, 304, 317, 327, 339 Chapter 4 - pp. 361, 370, 378, 386, 398, 415, 433, 443, 455 Chapter 5 - pp. 479, 489, 499, 508, 522, 531, 540, 555 Chapter 6 - pp. 577, 585, 594, 604, 616, 624, 632, 639-640 Chapter 7 - pp. 660-661, 668, 678, 688, 698, 706, 719, 726</p>
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Range of Reading and Level of Text Complexity

<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>To complete each Chapter Challenge, in the Active Physical Science program, students must construct explanations about physical phenomenon based on their investigative findings and scientific reading.</p> <p>Chapter 1 - Chapter Challenge, pp. 2-7, 120-121 Chapter 2 - Chapter Challenge, pp. 128-131, 208-209 Chapter 3 - Chapter Challenge, pp. 216-219, 344-345 Chapter 4 - Chapter Challenge, pp. 352-355, 460-461 Chapter 5 - Chapter Challenge, pp. 468-470, 559-561 Chapter 6 - Chapter Challenge, pp. 568-570, 643-645 Chapter 7 - Chapter Challenge, pp. 652-654, 729-731</p> <p>In Preparing for the Chapter Challenge students use these claims, with evidence, to deepen their understanding of observable events. The Physics/Chem Essential Questions asks students to describe, using evidence from "What Do You Know?" and "Why Do You Believe?." In each case, students must make a statement of their knowledge citing evidence to support their statement.</p> <p>Chapter 1 - pp. 16-17, 31, 48, 67, 87, 102, 113 Chapter 2 - pp. 136, 145, 160, 170, 180, 190, 203 Chapter 3 - pp. 229, 241, 251, 262, 273, 289, 304, 317, 327, 339 Chapter 4 - pp. 361, 370, 378, 386, 398, 415, 433, 443, 455 Chapter 5 - pp. 479, 489, 499, 508, 522, 531, 540, 555 Chapter 6 - pp. 577, 585, 594, 604, 616, 624, 632, 639-640 Chapter 7 - pp. 660-661, 668, 678, 688, 698, 706, 719, 726</p>
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Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects: Grades 11-12

Standards:	Active Physical Science Location:
Text Types and Purposes	
1. Write arguments focused on discipline-specific content.	<p>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 Section. In their work, students develop claims, use content specific vocabulary, provide evidence, and generate concluding statements.</p> <p>Chapter 1 - pp. 8-21, 22-33, 34-51, 52-71, 72-74, 75-89, 90-104, 105-117 Chapter 2 - pp. 132-137, 138-148, 149-163, 164-173, 174-175, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 264-275, 276-277, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 356-363, 364-371, 372-380, 381-388, 389-401, 402-419, 420-421, 422-435, 436-448, 449-457 Chapter 5 - pp. 471-472, 473-480, 481-491, 492-500, 501-509, 510-511, 512-523, 524-533, 534-542, 543-557 Chapter 6 - pp. 571-578, 579-586, 587-596, 597-605, 606-607, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 670-679, 680-689, 690-691, 692-700, 701-708, 709-721, 722-727</p>
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	<p>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 (Physics/Chem Words) in their Active Physical Science Logs to present information, explanations, and answers to the Investigate, Checking Up, and Understanding and Applying sections.</p> <p>Chapter 1 - pp. 8-21, 22-33, 34-51, 52-71, 72-74, 75-89, 90-104, 105-117 Chapter 2 - pp. 132-137, 138-148, 149-163, 164-173, 174-175, 176-181, 182-192, 193-205 Chapter 3 - pp. 220-231, 232-243, 244-253, 254-263, 264-275, 276-277, 278-291, 292-307, 308-319, 320-329, 330-341 Chapter 4 - pp. 356-363, 364-371, 372-380, 381-388, 389-401, 402-419, 420-421, 422-435, 436-448, 449-457 Chapter 5 - pp. 471-472, 473-480, 481-491, 492-500, 501-509, 510-511, 512-523, 524-533, 534-542, 543-557 Chapter 6 - pp. 571-578, 579-586, 587-596, 597-605, 606-607, 608-618, 619-625, 626-633, 634-641 Chapter 7 - pp. 655-662, 663-669, 670-679, 680-689, 690-691, 692-700, 701-708, 709-721, 722-727</p>
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 in the Active Physical Science program provides students an opportunity to increase their writing skill 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.</p> <p>Chapter 1 - pp. 13, 28, 46, 64, 82, 100, 110 Chapter 2 - pp. 135, 143, 159, 169, 179, 187, 201 Chapter 3 - pp. 226, 239, 249, 259, 271, 287, 301, 314, 325, 336 Chapter 4 - pp. 359, 368, 376, 384, 396, 412, 430, 440, 453 Chapter 5 - pp. 478, 488, 498, 507, 521, 530, 539, 554 Chapter 6 - pp. 576, 585, 593, 603, 615, 623, 631, 638 Chapter 7 - pp. 660, 667, 677, 687, 697, 705, 718, 725</p> <p>At the end of each section Physics/Chem to Go offers critical thinking and transfer of knowledge questions for more challenging writing opportunities to show knowledge of complex topics. (Examples can be found on pp. 19-20, 32, 49-51, and 68-71)</p>

<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>	<p>At the conclusion of each Learning Section is What Do You Think Now?, Physics/Chem Essential Questions, and Reflecting on the Section and the Challenge. These sections provide an opportunity for students to write over an extended 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 in the section.</p> <p>Chapter 1 - pp. 16-18, 30-31, 48-49, 66-67, 86-87, 101-102, 112-113 Chapter 2 - pp. 136, 144-145, 160-161, 170, 179-180, 189-190, 203-204 Chapter 3 - pp. 228-229, 241-242, 250-252, 261-262, 272-273, 289, 303-304, 316-318, 327-328, 338-339 Chapter 4 - pp. 360-361, 369-370, 377-378, 385-386, 398, 414, 415, 433-434, 442-443, 454-455 Chapter 5 - pp. 472, 478-479, 489-490, 499, 508-509, 521-522, 530-532, 540, 555 Chapter 6 - pp. 576-577, 585-586, 593-594, 603-604, 616-617, 624-625, 631-632, 639-640 Chapter 7 - pp. 660-661, 667-668, 677-678, 688-689, 697-698, 705-706, 718-719, 725-726</p>
<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.</p>	<p>Use of the Internet is not required for completion of the Active Physical Science program. However, the Internet will enhance and deepen student's experience with the content. In many cases use of the Internet will be needed to complete the optional Inquiring Further sections.</p> <p>Chapter 1 - pp. 20-21, 33, 51, 71, 89, 104, 115 Chapter 2 - pp. 137, 148, 163, 173 Chapter 3 - pp. 231, 243, 275, 291, 307, 319, 341 Chapter 4 - pp. 363, 380, 388, 401, 419, 448, 457 Chapter 5 - pp. 500, 533, 542, 557 Chapter 6 - pp. 578, 596, 605, 618, 633, 641 Chapter 7 - pp. 662, 700, 708, 721, 727</p>
<p>Research to Build and Present Knowledge</p>	
<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>The Inquiring Further at the end of the learning sections provides an opportunity for students to develop a sustained research project, create a self-generated question or solve a problem. In each case the guided inquiry activities broaden students experience with the content.</p> <p>Chapter 1 - pp. 20-21, 33, 51, 71, 89, 104, 115 Chapter 2 - pp. 137, 148, 163, 173 Chapter 3 - pp. 231, 243, 275, 291, 307, 319, 341 Chapter 4 - pp. 363, 380, 388, 401, 419, 448, 457 Chapter 5 - pp. 500, 533, 542, 557 Chapter 6 - pp. 578, 596, 605, 618, 633, 641 Chapter 7 - pp. 662, 700, 708, 721, 727</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, in the Active Physical Science program, students must construct explanations about physical phenomenon and observed events. Students integrate information from various sources, investigations, readings, and their peers to prepare their presentations. Students create poster, PowerPoint's, charts, graphs, skits, and plays to illustrate their recommendations, findings, ideas, and claims and cite sources to avoid plagiarism.</p> <p>Chapter 1 - Chapter Challenge, pp. 2-7, 120-121 Chapter 2 - Chapter Challenge, pp. 128-131, 208-209 Chapter 3 - Chapter Challenge, pp. 216-219, 344-345 Chapter 4 - Chapter Challenge, pp. 352-355, 460-461 Chapter 5 - Chapter Challenge, pp. 468-470, 559-561 Chapter 6 - Chapter Challenge, pp. 568-570, 643-645 Chapter 7 - Chapter Challenge, pp. 652-654, 729-731</p>

<p>9. Draw evidence from informational texts to support analysis, reflection, and research.</p>	<p>At the conclusion of each Learning Section is What Do You Think Now?, Physics/Chem Essential Questions, and Reflecting on the Section and the Challenge. These sections provide an opportunity for students to write over an extended 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 in the section.</p> <p>Chapter 1 - pp. 16-18, 30-31, 48-49, 66-67, 86-87, 101-102, 112-113 Chapter 2 - pp. 136, 144-145, 160-161, 170, 179-180, 189-190, 203-204 Chapter 3 - pp. 228-229, 241-242, 250-252, 261-262, 272-273, 289, 303-304, 316-318, 327-328, 338-339 Chapter 4 - pp. 360-361, 369-370, 377-378, 385-386, 398, 414, 415, 433-434, 442-443, 454-455 Chapter 5 - pp. 472, 478-479, 489-490, 499, 508-509, 521-522, 530-532, 540, 555 Chapter 6 - pp. 576-577, 585-586, 593-594, 603-604, 616-617, 624-625, 631-632, 639-640 Chapter 7 - pp. 660-661, 667-668, 677-678, 688-689, 697-698, 705-706, 718-719, 725-726</p>
<p>Range of Writing</p>	
<p>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.</p>	<p>Every chapter in the Active Physical Science program provides students an opportunity to increase their skills in writing over short time frames. The Checking Up and Physics/Chem to Go sections require students to respond in complete sentences using academic language to explain new knowledge.</p> <p>Chapter 1 - pp. 13, 19-20, 28, 32, 46, 49-51, 64,68-71, 82, 88-89, 100, 103-104, 110, 114-115 Chapter 2 - pp. 135, 137, 143, 146-147, 159, 162-163, 169, 171, 179, 181, 187, 191-192, 201, 204-205 Chapter 3 - pp. 226, 230-231, 239, 242-243, 249, 252-253, 259, 262-263, 271, 274-275, 287, 290-291, 301, 305-307, 314, 318-319, 325, 328-329, 336, 340-341 Chapter 4 - pp. 359, 362-363, 368, 370-371, 376, 379-380, 384, 387-388, 396, 399-401, 412, 416-419, 430, 434-435, 440, 444-448, 453, 456-457 Chapter 5 - pp. 472, 478, 480, 488, 490-491, 498, 499-500, 507, 509, 521, 523, 530, 532-533, 539, 541-542, 554, 556-557 Chapter 6 - pp. 576, 578, 585, 586, 593, 595, 603, 605, 615, 617, 623, 625, 631, 633, 638, 640-641 Chapter 7 - pp. 660, 661-662, 667, 669, 677, 679, 687, 689, 697, 699, 705, 707-708, 718, 720-721, 725, 727</p> <p>At the conclusion of each Learning Section is What Do You Think Now?, Physics/Chem Essential Questions, and Reflecting on the Section and the Challenge. These sections provide an opportunity for students to write over an extended 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 in the section.</p> <p>Chapter 1 - pp. 16-18, 30-31, 48-49, 66-67, 86-87, 101-102, 112-113 Chapter 2 - pp. 136, 144-145, 160-161, 170, 179-180, 189-190, 203-204 Chapter 3 - pp. 228-229, 241-242, 250-252, 261-262, 272-273, 289, 303-304, 316-318, 327-328, 338-339 Chapter 4 - pp. 360-361, 369-370, 377-378, 385-386, 398, 414, 415, 433-434, 442-443, 454-455 Chapter 5 - pp. 472, 478-479, 489-490, 499, 508-509, 521-522, 530-532, 540, 555 Chapter 6 - pp. 576-577, 585-586, 593-594, 603-604, 616-617, 624-625, 631-632, 639-640 Chapter 7 - pp. 660-661, 667-668, 677-678, 688-689, 697-698, 705-706, 718-719, 725-726</p>