Science Textbook Correlation to the
2018 Chemistry Standards of Learning Curriculum Framework

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2018 Earth Science Standards of Learning	
STANDARD	**Correlation: Must address both the standards and the curriculum framework. Use page number and ATE for Annotated Teacher Edition or CT for Core Technology. (Identify no more than 8 correlations.)**
ES.2 The student will demonstrate an understanding that there are scientific concepts related to the origin and evolution of the universe. Key ideas include	
a) the big bang theory explains the origin of universe;	**Ch 8 – Solar System Origins** SB: 200-201; ATE: 264-265
b) stars, star systems, and galaxies change over long periods of time;	**Ch 8 – Solar System Origins** SB:200-201, 203-206; ATE: 264-265, 267-271
c) characteristics of the sun, planets and their moons, comets, meteors, asteroids, and dwarf planets are determined by materials found in each body; and	**Ch 8 – Solar System Origins** SB:200-201, 203-206, 212-215; ATE: 264-265, 267-271, 279-281

d) evidence from space exploration has increased our understanding of the structure and nature of our universe.	**Ch 8 – Solar System Origins** SB: 195-196, 212-215; ATE: 259-260, 279-281

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ES.3 The student will investigate and understand that Earth is unique in our solar system. Key ideas include	
a) Earth supports life because of its relative proximity to the sun and other factors; and	**Ch 1 – Comparing Earth to Other Worlds** SB: 6-12; ATE: 10-13
b) the dynamics of the sun-Earth-moon system cause seasons, tides, and eclipses.	Not addressed

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ES.4 The student will investigate and understand that there are major rock-forming and ore minerals. Key ideas include	
a) analysis of physical and chemical properties supports mineral identification;	**Ch 14 – Building Earth's Crust** SB: 410-414, 426; ATE: 540-544
b) characteristics of minerals determine the uses of minerals; and	**Ch 15 – Mineral Resources** SB: 435-438, 453-456; ATE: 577-580, 596-601
c) minerals originate and are formed in specific ways.	**Ch 15 – Mineral Resources** SB:439-444; ATE: 581-586

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ES.5 The student will investigate and understand that igneous, metamorphic, and sedimentary rocks can transform. Key ideas include	
a) Earth materials are finite and are transformed over time;	**Ch 13 – Sedimentary Processes in a Delta** SB: 363-370, 384-387; ATE: 480-485, 503-506 **Ch 14 – Building Earth's Crust** SB: 415-423, 426-427; ATE: 545-555
b) the rock cycle models the transformation of rocks;	**Ch 14 – Building Earth's Crust** SB: 415-419; ATE: 545-551
c) layers of Earth have rocks with specific chemical and physical properties; and	**Ch 9 – Exploring Earth's Interior** SB: 227-230, 233-235, 241-245; ATE: 303-306, 310-313, 319-325
d) plate tectonic and surface processes transform Earth materials.	*All previous citations for this standard ES.5 plus* **Ch 11 – Subduction-Zone Volcanoes** SB: 293-295, 298-303; ATE: 388-391, 397-400 **Ch 12 – Divergent Boundaries** SB: 350-353; ATE: 460-463

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ES.6 The student will investigate and understand that resource use is complex. Key ideas include	
a) global resource use has environmental liabilities and benefits;	**Ch 5 – Global Climate** SB: 124-135; ATE: 169-180 **Ch 15 – Mineral Resources** 447-456; ATE: 589-601 **Ch 16 – Energy Resources** SB: 461-467, 479-484; ATE: 611-613, 631-637
b) availability, renewal rates, and economic effects are considerations when using resources;	**Ch 15 – Mineral Resources** SB: 433-444; ATE: 576-586 **Ch 16 – Energy Resources** SB: 461-467; ATE: 611-613
c) use of Virginia resources has an effect on the environment and the economy; and	Local standard, not addressed
d) all energy sources have environmental and economic effects.	**Ch 5 – Global Climate** SB: 124-135; ATE: 169-180 **Ch 16 – Energy Resources** SB: 461-467, 479-484; ATE: 611-613, 631-637

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ES.7 The student will investigate and understand that plate tectonic theory explains Earth's internal and external geologic processes. Key ideas include	
a) convection currents in Earth's interior lead to the movement of plates and influence the distribution of materials in Earth's layers, and may impact the magnetic field;	**Ch 9 – Exploring Earth's Interior** SB: 241-245; ATE: 319-325 **Ch 12 – Divergent Boundaries** SB: 342-345; ATE: 449-451
b) features and processes occur within plates and at plate boundaries;	**Ch 10 – Earthquakes and Transform Boundaries** SB: 250-288; ATE: 330-374 **Ch 11 – Subduction-Zone Volcanoes** SB: 289-328; ATE: 375-428 **Ch 12 – Divergent Boundaries** SB: 329-356; ATE: 429-466
c) interaction between tectonic plates causes the development of mountain ranges and ocean basins; and	**Ch 11 – Subduction-Zone Volcanoes** SB: 293-295, 317-322; ATE: 388-391, 416-421 **Ch 12 – Divergent Boundaries** SB: 342-352; ATE: 449-463
d) evidence of geologic processes is found in Virginia's geologic landscape.	Local standard, not addressed

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ES.8 The student will investigate and understand that freshwater resources influence and are influenced by geologic processes and human activity. Key ideas include	
a) water influences geologic processes including soil development and karst topography;	**Ch 13 – Sedimentary Processes in a Delta** SB: 358-394; ATE: 468-518
b) the nature of materials in the subsurface affect the water table and future availability of fresh water;	**Ch 2 – Seeking Water From Earth** SB: 28-45; ATE: 44-60
c) weather and human usage affect freshwater resources, including water locations, quality, and supply; and	**Ch 2 – Seeking Water From Earth** SB: 14-50; ATE: 20-66
d) stream processes and dynamics affect the major watershed systems in Virginia, including the Chesapeake Bay and its tributaries.	Local standard, not addressed

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ES.9 The student will investigate and understand that many aspects of the history and evolution of Earth and life can be inferred by studying rocks and fossils. Key ideas include	
a) traces and remains of ancient, often extinct, life are preserved by various means in sedimentary rocks;	**Ch 6 – Climate Change in Earth's History** SB: 149-154; ATE: 204-209
b) superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating rocks and Earth events and processes;	**Ch 8 – Solar System Origins** SB: 197-199; ATE: 261-263 **Ch 14 – Building Earth's Crust** SB: 423-426; ATE: 556-560
c) absolute (radiometric) and relative dating have different applications but can be used together to determine the age of rocks and structures; and	**Ch 8 – Solar System Origins** SB: 197-199; ATE: 261-263 **Ch 14 – Building Earth's Crust** SB: 423-426; ATE: 556-560
d) rocks and fossils from many different geologic periods and epochs are found in Virginia.	Local standard, not addressed

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ES.10 The student will investigate and understand that oceans are complex, dynamic systems and are subject to long- and short-term variations. Key ideas include	
a) chemical, biological, and physical changes affect the oceans;	**Ch 3 – Ocean Currents** SB: 51-78; ATE: 67-106
b) environmental and geologic occurrences affect ocean dynamics;	**Ch 3 – Ocean Currents** SB: 51-78; ATE: 67-106
c) unevenly distributed heat in the oceans drives much of Earth's weather;	**Ch 3 – Ocean Currents** SB: 66-76; ATE: 91-103 **Ch 4 – Regional Climate** SB: 102-103; ATE: 138-140
d) features of the sea floor reflect tectonic and other geological processes; and	**Ch 12 – Divergent Boundaries** SB: 333-353; ATE: 439-463

e) human actions, including economic and public policy issues, affect oceans and the coastal zone including the Chesapeake Bay.	**Chapter 6: Climate Change** SB: 169-170, 172; ATE 225-228, 230-231 **Chapter 13: Mississippi Blues** SB 387-390; ATE 506-512 Chesapeake Bay not addressed

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ES.11 The student will investigate and understand that the atmosphere is a complex, dynamic system and is subject to long-and short-term variations. Key ideas include	
a) the composition of the atmosphere is critical to most forms of life;	**Ch 1 – Comparing Earth to Other Worlds** SB: 6-9; ATE: 10-13 **Ch 14 – Building Earth's Crust** SB: 425-426; ATE: 569-560
b) biologic and geologic interactions over long and short time spans change the atmospheric composition;	**Ch 5 – Global Climate** SB: 127-138; ATE: 172-185
c) natural events and human actions may stress atmospheric regulation mechanisms; and	**Ch 5 – Global Climate** SB: 127-138; ATE: 172-185 **Ch 6 – Climate Change in Earth's History** 160-180; ATE: 216-238
d) human actions, including economic and policy decisions, affect the atmosphere.	**Ch 5 – Global Climate** SB: 124-138; ATE: 169-185 **Ch 6 – Climate Change in Earth's History** SB: 165-180; ATE: 220-238

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ES.12 The student will investigate and understand that Earth's weather and climate are the result of the interaction of the sun's energy with the atmosphere, oceans, and the land. Key ideas include	
a) weather involves the reflection, absorption, storage, and redistribution of energy over short to medium time spans;	**Ch 4 – Regional Climate** SB: 97-103; ATE: 132-140 **Ch 5 – Global Climate** SB: 115-123; ATE: 160-169
b) weather patterns can be predicted based on changes in current conditions;	
c) extreme imbalances in energy distribution in the oceans, atmosphere, and the land may lead to severe weather conditions;	
d) models based on current conditions are used to predict weather phenomena; and	

e) changes in the atmosphere and the oceans due to natural and human activity affect global climate.	**Ch 5 – Global Climate** SB: 124-138; ATE: 169-185 **Ch 6 – Climate Change in Earth's History** **SB:** 165-18**0; A**TE: **220-238**