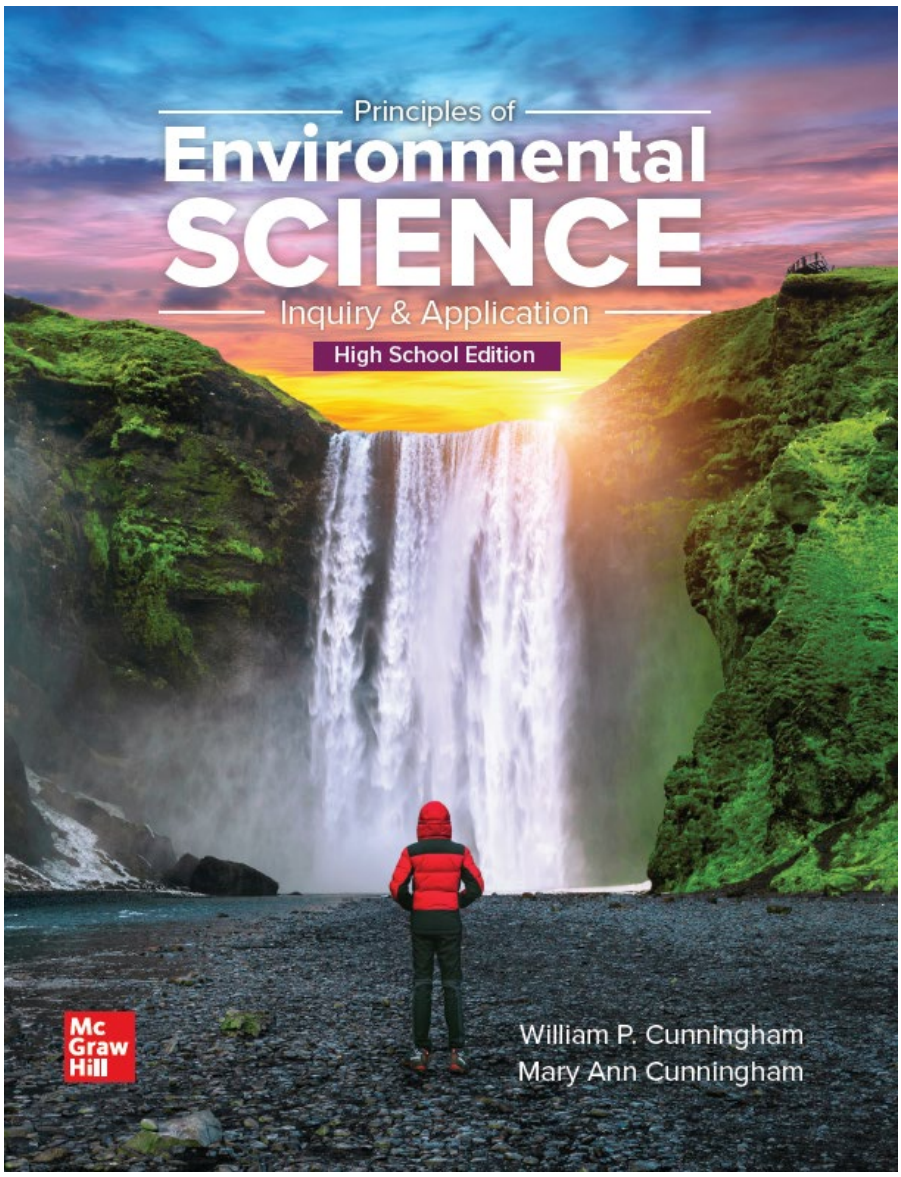
Next Generation Science Standards: Earth and Space Science Performance Expectations

CORRELATION GUIDE

for *Principles of Environmental Science: Inquiry and Application*

/



By William Cunningham and Mary Ann Cunningham
High School Edition, © 2023
ISBN 978-0-07-700662-4

Correlation of Next Generation Science Standards,
Earth and Space Science Performance Expectations to
Principles of Environmental Science: Inquiry and Application
by William Cunningham and Mary Ann Cunningham

Next Generation Science Standards Earth and Space Science Performance Expectations	Principles of Environmental Science: Inquiry and Applications ©2023
HS-ESS2 Earth's Systems	
HS-ESS2-1. Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.	455-459 *Critical Thinking* 485 (#1) *Section Review* 459 (#1, #2) *Use the Practices* 455
HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	48, 259, 263, 266, 299-301, 376, 478 *Case Study* 68,-69, 369 *Data Analysis Lab* 65 *Key Concepts75* 384-385
HS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection	456-457, 460-461 *Critical Thinking* 485 (#2)
HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes	73, 244-248, 250-252 *Exploring Science* 95 *Section Review* 252 (#1)
HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	78, 98, 425, 429-430, 461, 462, 478-480, 481-482
HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	75, 97, 98-99 *Data Analysis Lab* 65
HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	109-110 *Case Study* 107-108 *Key Concepts 116-117* *Use the Practices* 109

Next Generation Science Standards Life Science Performance Expectations	Principles of Environmental Science: Inquiry and Applications ©2023
HS-ESS3 Earth and Human Activity	
HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	260, 324-325, 328-334, 476, 477-480, 481-482, 635, 656-660 *Case Study* 316-317 *Critical Thinking* 485 (#3) *Get It?* 329 *Section Review* 482 (#3) *Use the Practices* 475, 656 *What Do You Think?* 338-339
HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios	471-475, 592-593, 596-597, 638-640 *Case Study* 35-36, 453-454 *Critical Thinking* 485 (#5) *Exploring Science* 642-643, 646, 647 *Get It?* 639 *Key Concepts* 214-215, 308-309, 594-595 *Use the Practices* 465
HS-ESS3-3. Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.	45-46, 208-213, 328-329, 390-399, 401-402, 408-411, 416-417, 661-664 *Case Study* 316-317 *Data Analysis Lab* 367 *Get It?* 392 *Key Concepts* 52-53, 214-215 *Section Review* 402 (#1) *Use the Practices* 47, 412 *What Do You Think? 395*
HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	304-307, 354-357, 360-361, 473-475, 584-591 *Case Study* 486-487 *Exploring Science* 608 *Key Concepts* 358-359 *Life Cycle Analysis* 587 *Section Review 591* (#4) *Use the Practices* 354, 584, 600
HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems.	41-42, 253-263, 266 *Case Study* 240-241 *Key Concepts* 264-265 *Use the Practices* 248
HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	253-254 *Data Analysis Lab* 279 *Key Concepts* 264-265

Next Generation Science Standards Crosscutting Concepts	Principles of Environmental Science: Inquiry and Applications ©2023
1. Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.	75-78, 119-120, 131-134, 187-199, 199-204 *Critical Thinking* 237 (#1) *Data Analysis Lab* 34, 65 *Exploring Science* 10-11
2. Cause and effect: Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.	250-252, 263, 266, 299-301, 580-581 *Case Study* 240-241, 406-407, 613-614, 654-655 *Critical Thinking* 106 (#5), 485 (#1) *Data Analysis Lab* 145, 184 *Exploring Science* 95, 262, 294, 470 *Key Concepts* 264-265 *Section Review* 303 (#1-#3) *Use the Practices* 318
3. Scale, proportion, and quantity. In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.	73-74, 248-252, 458-459, 560-561 *Exploring Science* 95, 127 *Key Concepts* 558-559
4. Systems and system models. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.	47-48, 70-74. 187, 242-248, 318-324, 360, 455-459 *Case Study* 4-5, 35-36, 107-108, 453-454, 538-539, 631-634 *Critical Thinking* 278 (#1) *Data Analysis Lab* 106 *Key Concepts* 92-93, 358-359 *Section Review* 324 (#1) *Use the Practices* 70
5. Energy and matter: Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.	84-91, 94, 96-103, 250-252, 319, 343, 360, 376, 431, 434-437, 460-461, 555-556, 560-561 *Case Study* 68-69 *Critical Thinking* 106 (#5), 278 (#2) *Data Analysis Lab* 106 *Key Concepts* 92-93, 358-359, 558-559 *Life-Cycle Analysis* 587 *Section Review* 90 (#1, #2), 103 (#1-#3), 252 (#3) *Use the Practices* 84, 91, 97
6. Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.	80-81, 109, 242-246, 509-511, 517, 520-521, 525-527 *Section Review* 512 (#3), 522 (#1, #2)
7. Stability and change. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.	70-74, 134-142, 253-263, 266, 376, 455-459 *Case Study* 68-69, 146-147, 185-186, 240-241, 280-281, 316-317, 368-369, 486-487 *Critical Thinking* 145 (#5) *Data Analysis Lab* 106, 184 *Key Concepts* 264-265 *Section Review* 74 (#1-#3), 137 (#1), 142 (#1-#3), 459 (#1) *Use the Practices* 130, 137

Next Generation Science Standards Science and Engineering Practices	Principles of Environmental Science: Inquiry and Applications ©2023
1. Asking questions (for science) and defining problems (for engineering)	18-19 *Get It?* 18 *Use the Practices* 6, 130, 199, 253, 282, 339, 390, 438, 465, 507, 638, 677
2. Developing and using models	20, 148-149, 150-153, 170-171, 174-175 *Critical Thinking* 184 (#1, #2), 404 (#4) *Get It?* 402 *Health Environment: Go Online* 537 *Life-Cycle Analysis* 587 *Review Questions* 183 (#1) *Use the Practices* 24, 70, 84, 164, 205, 298, 354, 431, 527, 555, 584, 615, 665
3. Planning and carrying out investigations	9, 12-13 20-21 *Assessing Toxins* 567 *Get It?* 21 *Use the Practices* 37, 109, 227, 349, 412, 688
4. Analyzing and interpreting data	21-22 *Data Analysis Lab* 34, 65, 106, 145, 184, 237, 279, 314-315, 367, 404-405, 451-452, 485, 535, 579, 612, 653, 656, 693 *Key Concepts* 214-215, 594-595 *Math Connection* 200 *Key Concepts* 162-163 *Use the Practices* 74, 208, 248, 418, 512
5. Using mathematics and computational thinking	11-12, 22, 111, 148-149, 150-153, 490-491, 638-641 *Critical Thinking* 535 (#1) *Exploring Science* 10-11, 642-643 *Math Connection* 12, 43, 134, 151, 157, 190, 255, 288, 323, 372, 411, 424, 488, 508, 574, 592, 640 *Use the Practices* 41, 91, 148, 155, 324, 564
6. Constructing explanations (for science) and designing solutions (for engineering)	19-20 *Health Environment, Go Online* 239 *Use the Practices* 47, 97, 172, 269, 304, 318, 370, 408, 459, 522, 540, 622, 661
7. Engaging in argument from evidence	23 *Section Review* 23 (#3), 312 (#2) *Use the Practices* 27, 137, 174, 212, 292, 361, 442, 475, 499, 600, 631 *What Do You Think?* 273, 395, 400-401, 501, 600
8. Obtaining, evaluating, and communicating information	23 *A Personal Hazardous Waste Inventory* 602 *Environment, Science, and Policy in Your Community* 660 *Key Concepts* 669 *Use the Practices* 17, 56, 179, 187, 242, 310, 328, 386, 423, 455, 492, 551, 582, 644, 673