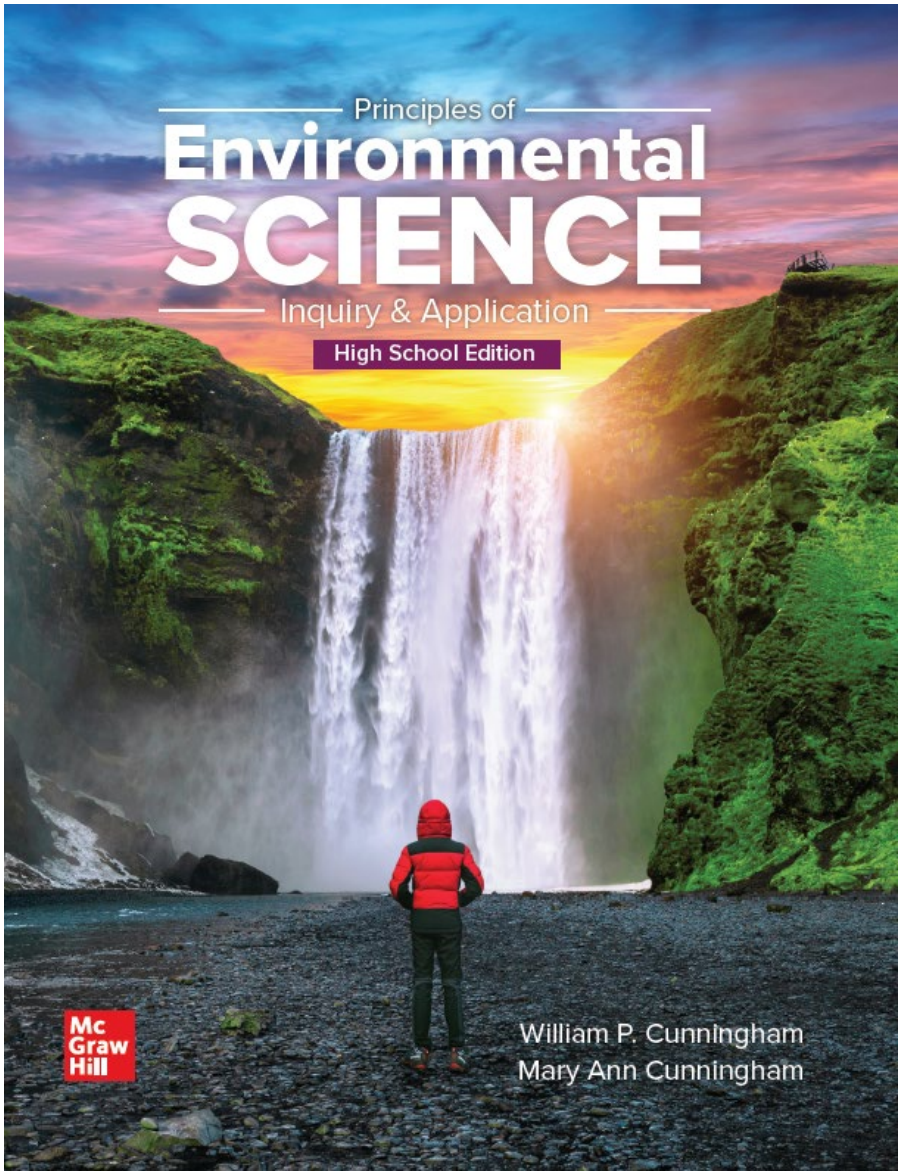
Next Generation Science Standards: Engineering Design Performance Expectations
CORRELATION GUIDE
for *Principles of Environmental Science: Inquiry and Application*



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

Next Generation Science Standards Engineering Design Performance Expectations	**Principles of Environmental Science: Inquiry and Applications ©2023**
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.	45-46, 269-276, 310-312, 376-377 *Healthy Environment,* 3 *Key Concepts* 308-309, 385, 432-433 *Section Review* 276 (#3), 312 (#3) *What Do You Think?* 395
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.	19-20 *Healthy Environment,* 67
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.	176-179, 227-234, 269-276, 334-337, 360, 361-364, 376-377, 390-399, 401-402, 438-445, 447-449, 473-475, 527-532, 638-642, 647-650 *Case Study* 35-36, 146-147, 453-454 *Exploring Science* 226, 346, 400-401, 608, 642-643, 646 *Health Environment,* 239 *Key Concepts* 52-53, 308-309, 358-359, 385, 432-433, 518-519 *Section Review* 234 (#3), 276 (#3), 532 (#1) *What Do You Think?* 168, 338-339, 395
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.	*Healthy Environment,* 537

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