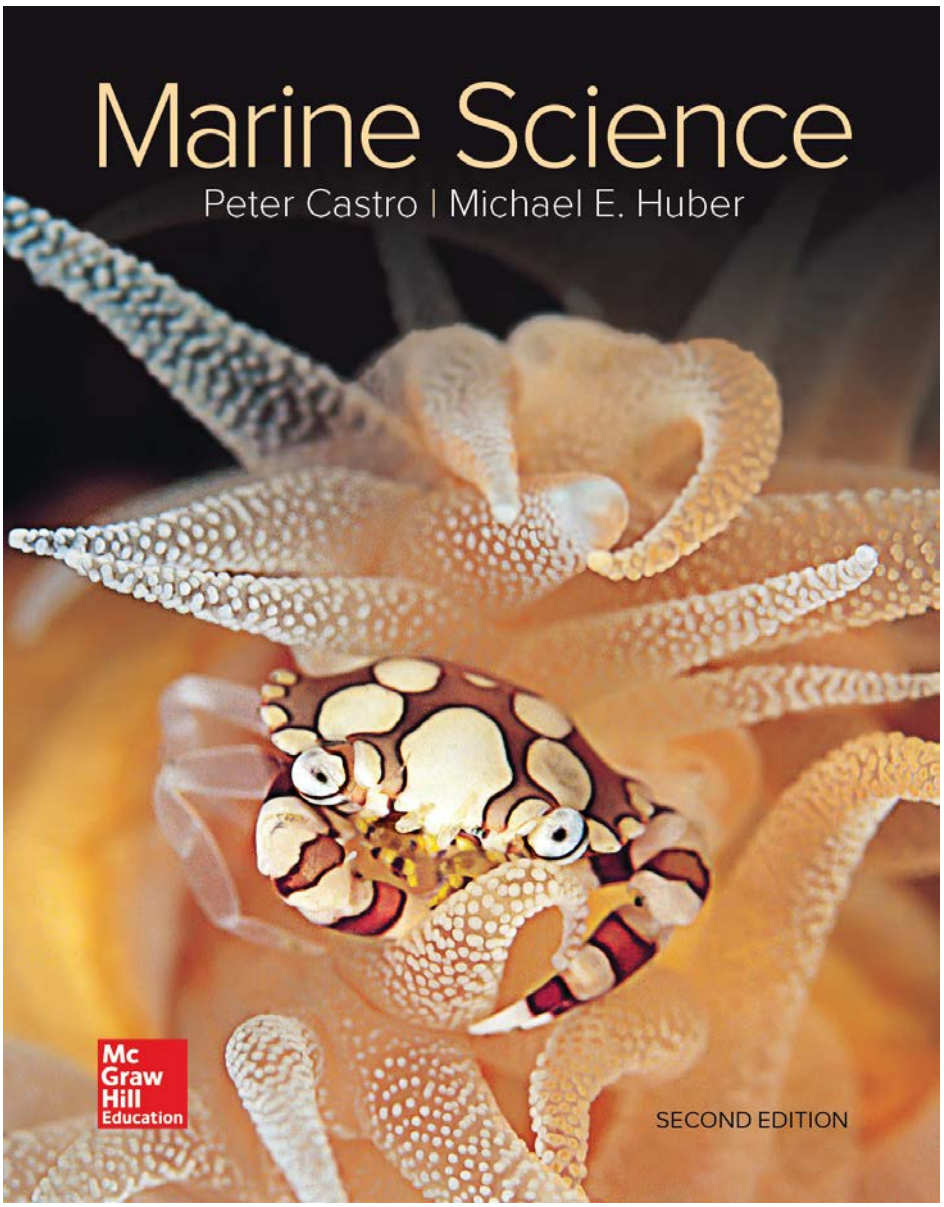
NGSS
CORRELATION GUIDE
Marine Science



By Peter Castro & Michael E. Huber
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NGSS Correlation
***Marine Science*, (2e)**
by Peter Castro & Michael E. Huber

Next Generation Science Standards Life Science Performance Expectations	Marine Science, 2nd Edition, ©2019
HS-LS1 From Molecules to Organisms: Structures and Processes	
HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	Pages cited are relevant content, no explanation asked for: 148, 149-150
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	158 *Reviewing the Main Idea* 159 (#2)
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Feedback mechanisms not addressed directly. Pages cited mention homeostasis or describe mechanisms organisms use to maintain homeostasis. 147, 171-176, 290-291, 317-318, 325, 351
HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Pages cited are relevant content, no model asked for: 160, 212
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	Pages cited are relevant content, no model asked for: 150-151, 153, 188-189 *Reviewing the Main Idea* 153 (#2)
HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	Pages cited are relevant content, no explanation asked for: 147-150, 151, 152
HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	Pages cited are relevant content, no model asked for: 151-152 *Reviewing the Main Idea* 153 (#2)

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HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	
HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Pages cited are relevant content, mathematical/computational not addressed: 371-373 *Reviewing the Main Idea* 379 (#3)
HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	Can be incorporated into the following content: 79, 369-373, 461-462, 642-644, 645-647 *Habitat Spotlight* 78 *Reviewing the Main Idea* 79 (#3)
HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	74-75, 152, 384-391, 393-395, 407, 428, 457-458, 478, 521, 557-567 *Chapter Project* 223 *Data Analysis Lab* 601 *Review Questions* 396 (#10, #12, #13) *Reviewing the Main Idea* 395 (#1-#3)
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	386-390, 558-559 *Data Analysis Lab* 397 *Review Questions* 396 (#2)
HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Pages cited are relevant content, no model asked for: 74-75, 111, 391, 393 *Reviewing the Main Idea* 395 (#3)
HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	Can be incorporated into the following: 418-420, 460, 645-647
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*	664-667 *Chapter Project* 670 *Habitat Spotlight* 460 *Humans and the Ocean* 529 *Nature of Science* 378 *Reviewing the Main Idea* 667 (#1, #2) *Review Questions 669* (#11) *Unit Project* 144, 366

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HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	300-301, 355, 362
HS-LS3 Heredity: Inheritance and Variation of Traits	
HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	Pages cited are relevant content, no questions asked for: 149-150, 160, 161-162
HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	Discussed in context recombination by sexual reproduction: 162-163
HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	164, 369-370, 375-376 *Chapter Project* 274
HS-LS4 Biological Evolution: Unity and Diversity	
HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Can be incorporated into discussion of evolution and phylogenetics. 164, 168-169 *Marine Science in Action* 335 *Nature of Science* 166 *Reviewing the Main Idea* 170 (#2)
HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	Pages cited have relevant content, no explanation asked for: 164, 369-370, 375-376

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HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	164, 369-370, 375-376 *Chapter Project* 274
HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	164, 369-370, 375-376 *Chapter Project* 274
HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	79, 140-141, 164, 371, 418-420, 642-643, 645-647, 660 *Habitat Spotlight* 78 *Nature of Science* 378 *Reviewing the Main Idea* 141 (#3)
HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*	Simulation not specifically specified, but pages present content and activities that address human impacts on biodiversity. 664-667 *Chapter Project* 670 *Habitat Spotlight* 460 *Humans and the Ocean* 529 *Nature of Science* 378 *Reviewing the Main Idea* 667 (#1, #2) *Review Questions 669* (#11) *Unit Project* 144, 366