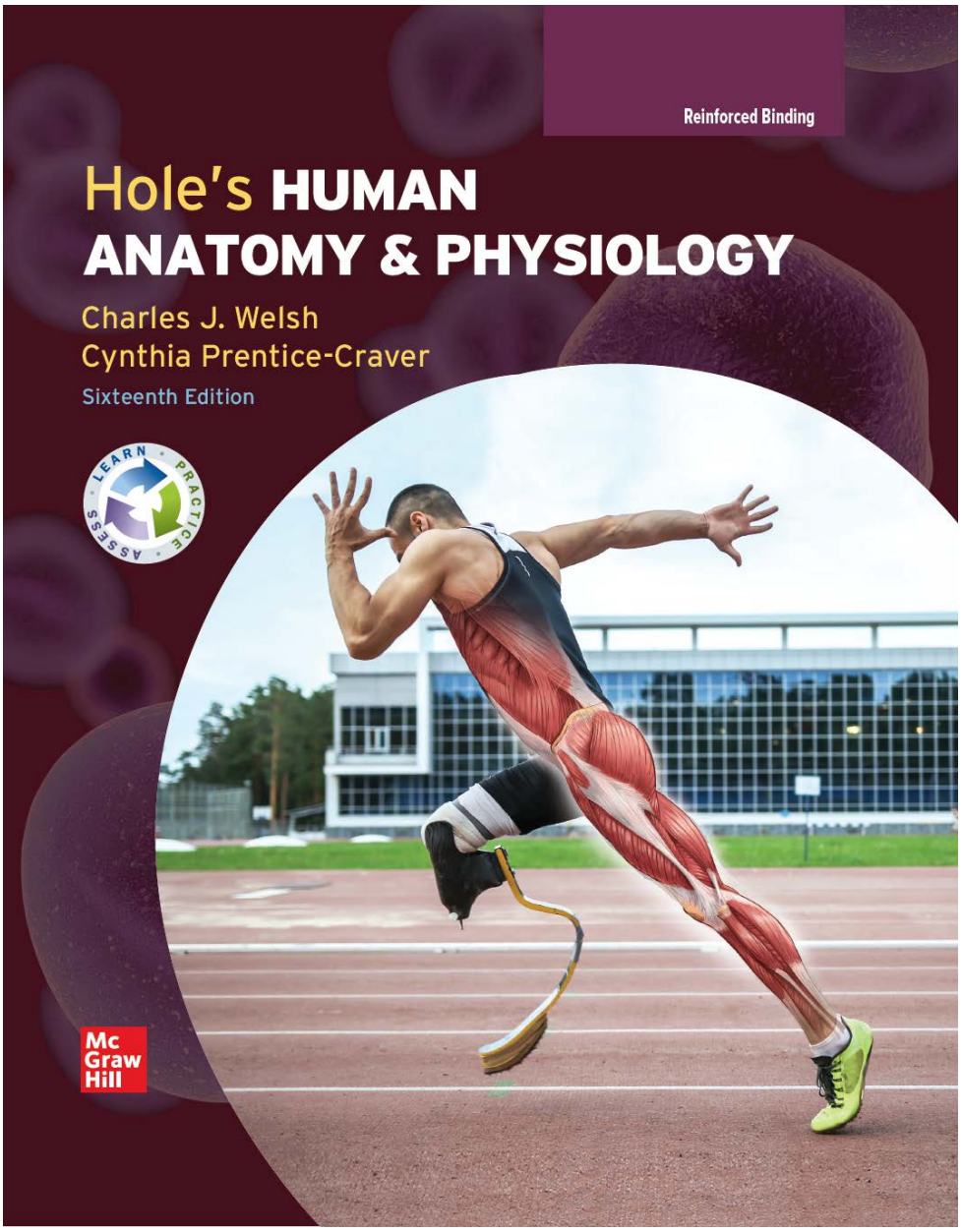
Next Generation Science Standards: Life Science Performance Expectations

CORRELATION GUIDE

for Hole's Human Anatomy & Physiology



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Correlation of Next Generation Science Standards,
Life Science Performance Expectations to
***Hole's Human Anatomy & Physiology,* (15e)**
by David Shier, Jackie Butler, & Ricki Lewis

Next Generation Science Standards Life Science Performance Expectations	Hole's Human Anatomy & Physiology High School Edition, ©2021
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.	78, 139, 142-147 *Assess: Chapter Assessments 150* (#24, #38) *Practice* 79 (#6)
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Does not callout use of models but topic coverage provided: 12, 20-21, 23-26 *Assess: Chapter Assessments* 35 (#4, #20) *Assess: Integrative Assessment/Critical Thinking* 36 (#2) *Practice* 14 (#1-#3), 27 (#6)
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Does not callout investigation but topic coverage provided: 15, 16-20, 505-507, 507, 509, 512, 518 *Assess: Chapter Assessments* 35 (#8-#11), 534 (#31, #32, #35) *Assess: Integrative Assessment/Critical Thinking* 36 (#4), 534 (#2, #7) *Practice* 19 (#16), 507 (#2), 518 (#3)
HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Does not callout use of model but topic coverage provided: 12, 15, 86, 111-115, 117-120 *Practice* 86 (#2), 115 (#2)
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	NA

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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.	73-79, 126-127, 136-137, 142-148 *Assess: Chapter Assessments* 82 (#32, #35, #41), 149 (#2, #3), 150 #38 *Practice* 128 (#2)
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.	Model not discussed. Topic covered at: 130-138, 953-956 *Assess: Chapter Assessments* 138 (#10), 150 (#18) *Practice* 133 (#2) 134 (#1, #3)
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.	NA
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.	NA
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.	NA
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	NA
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.	NA
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.	NA
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. *	NA
HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	NA

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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.	139, 846-848, 892, 929-937 *Assess: Chapter Assessments* 944 (#1, #2) *Practice* 930 (#3), 933 (#2)
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.	148-149, 846-848, 932 *Assess: Chapter Assessments* 150 (#40, #41), 884 (#3) *Practice* 149 (#1-#4), 848 (#3)
HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	Very brief mention of population variation: 935, 936-7
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.	NA
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.	NA
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.	NA
HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	NA
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.	NA
HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. *	NA

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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.	Can be addressed in the following: *Clinical Connections* 388, 390, 658, 904 *From Science to Technology* 64, ,894, 897
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.	NA
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.	Can be addressed in the following: *Clinical Connections* 388, 390, 658, 904 *From Science to Technology* 64, ,894, 897
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.	NA

Next Generation Science Standards Science and Engineering Practices	Hole's Human Anatomy & Physiology High School Edition, ©2021
1. Asking questions (for science) and defining problems (for engineering)	Scientific method: 11, 947 Engineering can be incorporated into the following: *Assess: Integrative Assessments/Critical Thinking* 180 (#1), 295 (#3), 925 (#6) *Clinical Application* 294, 470 *From Science to Technology* 81, 156, 178, 583, 894
2. Developing and using models	NA Could be incorporated into discussions of diffusion, mitosis, DNA, circulatory system, etc. but models are not specifically noted in any of the activities.
3. Planning and carrying out investigations	Coverage is steps of scientific method: 11, 947
4. Analyzing and interpreting data	Poor coverage: *Assess: Integrative Assessments/Critical Thinking* 256 (#6), 534 (#1), 566 (#8), 745 (#1, #6)
5. Using mathematics and computational thinking	Text is very light on asking students due to computations. Following involve mathematical concepts that could be expanded upon: 62, 69-71, 931-936, 937-938 *Assess: Integrative Assessments/Critical Thinking* 82 (#1), 944 (#1) 945 (#4, #5) *From Science to Technology* 63
6. Constructing explanations (for science) and designing solutions (for engineering)	*Assess: Integrative Assessments/Critical Thinking* 36 (#4, #6), 82 (#5, #6),122 (#8), 180 (#1, #8), 392 (#3, #4), 446 (#4) *Practice* 15 (#11, #12)
7. Engaging in argument from evidence	*Assess: Integrative Assessments/Critical Thinking* 82 (#7), 295 (#3), 534 (#5), 710 (#5), 745 (#2), 945 (#7)
8. Obtaining, evaluating, and communicating information	Not explicitly stated, but can be incorporated into *Assess: Integrative Assessments/Critical Thinking* 36 (#3), 82 (#2), 122 (#8), 350 (#6), 392 (#5), 492 (#2), 566 (#4)

Next Generation Science Standards Crosscutting Concepts	Hole's Human Anatomy & Physiology High School Edition, ©2021
1. Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.	28, 61-62, 64, 65-67, 112-115, 139-144, 140-142, 155-156, 208-209, 894-904, 906-907 *From Science to Technology* 63, 140 *Practice* 142 (#2), Practice 144 (#1) 212 (#1)
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.	15, 16-20, 197-198, 506-507, 508-513, 517-518, 519, 522-526, 530, 588-590, 599-606, 688, 771-773, 828-830, 832-834, 839-841 *Assess: Integrative Assessments/Critical Thinking* 204 (#3), 534 (#2, #7, #8), 842 (#2, #4, #5), 886 (#3) *Clinical Application* 605, 830-831, 834 *Practice* 20 (#4), 507 (#1, #2), 510 (#3), 513 (#11), 518 (#3), 526 (#5), 590 (#14)
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.	Can be incorporated into the following: 12, 60-62, 65-66, 73-78, 86, 126-128, 155-157 *Assess: Integrative Assessments/Critical Thinking* 36 (#2) *Practice* 14 (#1-#3), 65 (#1, #3), 86 (#1)
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.	Can be incorporated into the following: 12, 17-20, 22-28, 209-211, 366-376, 423-444, 497-502, 505-508, 570-584, 667-671 *Clinical Application* 426 *From Science to Technology* 583, 690 *The Whole Picture* 207, 298, 496, 569, 666
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.	Can be incorporated into the following: 15, 132-139, 721-724 *Assess: Chapter Assessments* 150 (#14-#16, #18) *Practice* 133 (#1-#3), 134 (#2-#3), 138 #11 138 (#10, #11), 135 (#15), 138 (#8, #9, #12), 721 (#1, #2)
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.	11, 14, 89-94, 158-161, 208-211, 275-281, 573-577, 696-699 *Assess: Integrative Assessments/Critical Thinking* 122 (#3) *Practice* 12 (#3), 162 (#3, #4), 577 (#12) *From Science to Technology* 690
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.	Can be incorporated into the following: 14, 16-20, 29, 197-198, 201-203, 497-508, 769-772, 781, 903-907, 917-924 *Practice* 20 (#3), 198 (#4), 202 (#3)