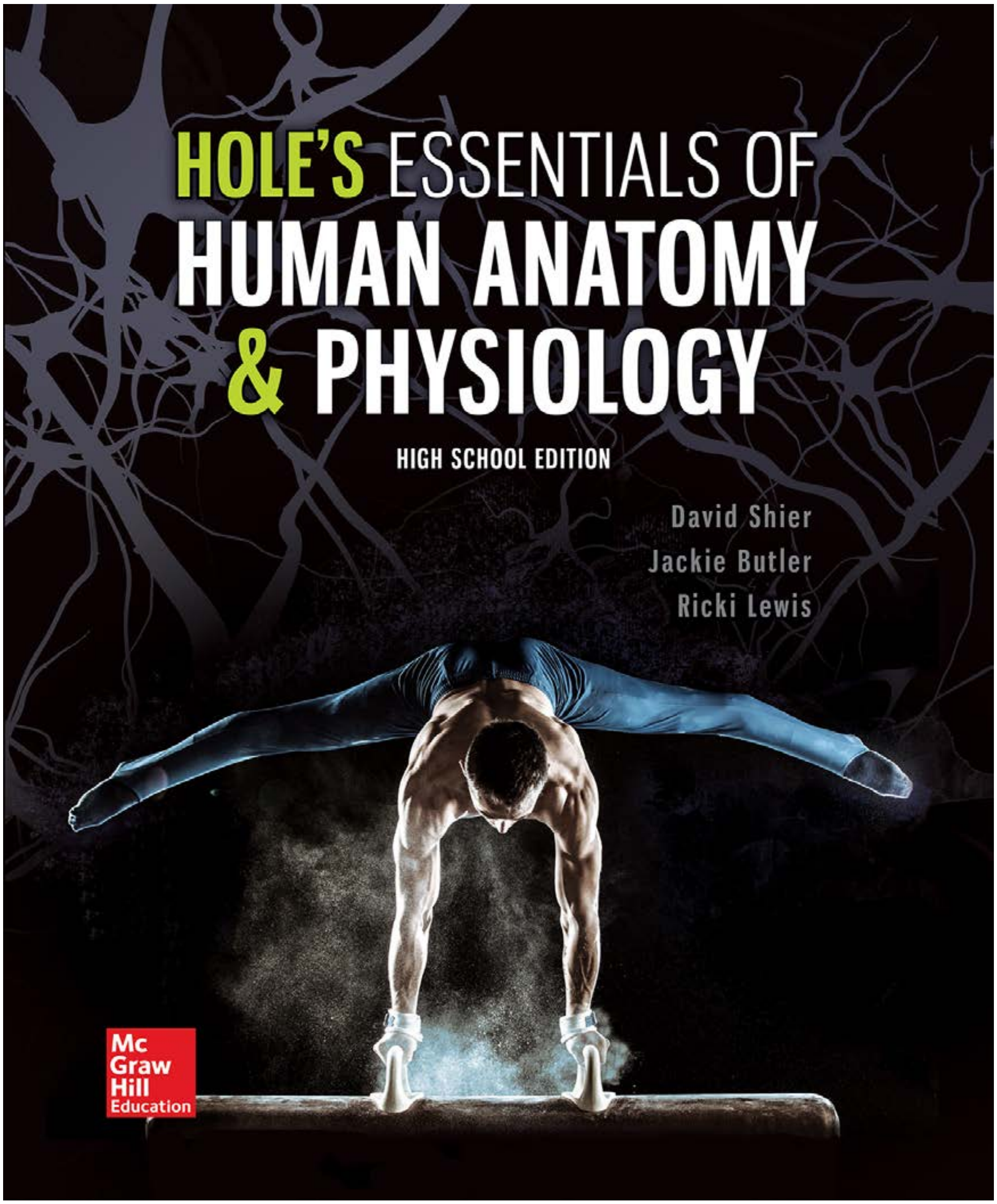
Next Generation Science Standards: Life Science Performance Expectations

CORRELATION GUIDE

for Hole's Essentials of Human Anatomy & Physiology



Correlation of Next Generation Science Standards,
Life Science Performance Expectations to
***Hole's Essentials of Human Anatomy & Physiology,* (1e)**
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Next Generation Science Standards Life Science Performance Expectations	Hole's Essentials of Human Anatomy & Physiology High School Edition, ©2018
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.	Chapter 2, Chemical Basis of Life, 2.3 Chemical Constituents of Cells, Assessment Questions 11-15 p. 57; Chapter 4, Cellular Metabolism, pp. 94-97; Genetics Engineering—Exome Sequencing, p. 98; Figure 4.13, Protein synthesis, p. 101; Figure 4.14, Protein synthesis occurs on ribosomes, p. 103; Chapter 5, Use the Practices, Arguing from Evidence, p. 125; Chapter 8, Genetics Engineering - Inherited Diseases of Muscle, p. 219; Chapter 16, Genetics Engineering - Cystic Fibrosis, p. 512; Chapter 20, Pregnancy, Growth, Development, and Genetics, Use the Practices, Using Mathematics, p. 630
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Chapter 1, Integrative Assessment/Critical Thinking, Question 2, p. 25; Chapter 6, Use the Practices, Using Models, p. 136; Chapter 7, Use the Practices, Communicating Information, p. 184; Chapter 8, Use the Practices, Using Models, p. 204; Chapter 9, Use the Practices, Using Models, p.245; Chapter 13, Integrative Assessments, Question 1, p. 426; Chapter 17, Use the Practices, Using Models, p. 538
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Chapter 1, Conducting Investigations, Use the Practices, p. 6; Chapter 1, Integrative Assessments/Critical Thinking, Question 4, p.25; Chapter 2, Use the Practices, Conducting Investigations, p. 45; Chapter 11, Use the Practice, Conducting Investigations, p. 351; Chapter 18, Lab Data Analysis, Question 3, p. 572
HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Chapter 3, Use the Practices, Analyzing Data, p. 77
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	This standard is beyond the scope of the program.

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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.	Chapter 2; Use the Practices, Communication Information, p. 35; Chapter 2, Integrative Assessments, Question 6, p. 57; Chapter 4, Use the Practices, Analyzing Data, p. 88; Chapter 15, Career Corner, Consider This, p. 457
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.	Chapter 4, Use the Practices, Using Mathematics, p. 93; Chapter 4, Question with Fig. 4.9, Glycolysis takes place in the cytosol and does not require oxygen, p. 95; Chapter 4, Integrative Assessments, Question 4, p. 107
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.	This standard is beyond the scope of the program.
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.	This standard is beyond the scope of the program.
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.	This standard is beyond the scope of the program.
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	This standard is beyond the scope of the program.
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.	This standard is beyond the scope of the program.
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.	This standard is beyond the scope of the program.
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*	This standard is beyond the scope of the program.
HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	This standard is beyond the scope of the program.

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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.	Chapter 4 *Use the Practices*, p. 97, Chapter 4 *Use the Practices* p. 99, Chapter 4 Practice Questions 1-4, p. 104
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.	Chapter 4, Genetic Engineering, Mutations, Concept Connections, Question 2, p. 100; Chapter 5, Integrative Assessments Question 2, p. 132
HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	Chapter 20, Use the Practices, Using Mathematics, p. 630; Chapter 20,Questiong with Fig 20.19 Cystic fibrosis, p. 633; Chapter 20, Integrative Assessment, Question 5, p. 637
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.	This standard is beyond the scope of the program.
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.	Chapter 11, Use the Practices, Constructing Explanations, p. 345; Chapter 19, Question with Fig. 19.3 During spermatogenesis, p. 580; Chapter 14, Diseases, Diagnosis, and Treatment, Immunity Breakdown, Question 2, p. 444; Chapter 19, Use the Practices, Asking Questions, p. 577
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.	Chapter 11 opener on pheromones and mate selection page 330; Chapter 20, Career Corner, Genetic Counselor, Consider This, p. 612;
HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	This standard is beyond the scope of the program.
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.	This standard is beyond the scope of the program.
HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*	This standard is beyond the scope of the program.

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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.	Engineer a Healthier World Unit Project: Necessity Breeds Invention; Chapter 14, Career Corner, Public Health Nurse, p. 428
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.	Engineer a Healthier World Unit Project: Mending a Broken Heart; Chapter 20, Genetic Engineering, Preimplantation Genetic Diagnosis, p. 632
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.	Engineer a Healthier World Unit Project: Curing Diabetes; Chapter 12, Genetic Engineering, p. 381
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.	Engineer a Healthier World Unit Project: I Can't Believe It's Not Liver

Next Generation Science Standards Science and Engineering Practices	Hole's Essentials of Human Anatomy & Physiology High School Edition, ©2018
1. Asking questions (for science) and defining problems (for engineering)	Chapter 1, Diseases, Diagnosis & Treatments-Computerized Tomography, Concept Connections, p. 21; Chapter 13, Use the Practices Asking Questions, p. 400;
2. Developing and using models	Chapter 1, Lab Data Analysis, Think Critically, Question 2, p.25; Chapter 6, Use the Practices, Using Models, p. 136
3. Planning and carrying out investigations	Chapter 1, Use the Practices, Conducting Investigations, p.6; Chapter 19, Use the Practices, Conducting Investigations, p. 603;
4. Analyzing and interpreting data	Chapter 4, Lab Data Analysis, Think Critically, p. 107; Chapter 18, Question with Fig. 18.2., p. 561
5. Using mathematics and computational thinking	Chapter 13, Use the Practices, Using Mathematics, p. 406; Chapter 13, Healthy Lifestyle Choices, Question 2, p. 409; Chapter 15, Use the Practices, Using Mathematics, p. 457; Chapter 18, Use the Practices, Using Mathematics, p. 562;
6. Constructing explanations (for science) and designing solutions (for engineering)	Chapter 6, Use the Practices, Analyzing the Data, p. 143
7. Engaging in argument from evidence	Chapter 9, Use the Practices, Arguing from Evidence, p. 246; Chapter 20, Question accompanying Fig. 20.19, p. 633
8. Obtaining, evaluating, and communicating information	Chapter 9, Use the Practices, Communicating Information, p. 263; Chapter 15, Career Corner, Registered Dietitian, p. 457
Next Generation Science Standards Crosscutting Concepts	**Hole's Essentials of Human Anatomy & Physiology High School Edition, ©2018**
1. Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.	Chapter 6, Integrative Assessments, Question 4, p. 150; Chapter 8, Healthy Lifestyle Choices, Use and Disuse of Skeletal Muscles, Concept Connections, Question 1, p. 215
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.	Chapter 8, Use the Practices, Arguing from Evidence, p. 208; Chapter 9, Genetic Engineering, Factors Affecting Synpatic Transmission, Concept Connection, p. 255;

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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.	Chapter 1, Use the Practices, Using Models, p. 5; Chapter 2, Lab Data Analysis, ATP and Cancer Research, p. 57; Chapter 6, Use the Practices, Using Mathematics, p. 136; Chapter 8, Use the Practices, Using Mathematics, p. 221;
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.	Chapter 7, Use the Practice, Communicating Information, p. 187; Chapter 10, Use the Practices, Using Models, p. 307;
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.	Chapter 1, Integrative Assessment Question 3, p. 25; Chapter 2, Integrative Assessments, Question 7, p. 57;
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.	Chapter 7, Integrative Assessments, Question 1, p. 197; Chapter 8, 8.8 Major Skeletal Muscles, Use the Practices, p. 221;
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.	Chapter 9, Use the Practices, Analyzing Data, p. 270; Chapter 14, Integrative Assessments, Question 4, p. 453