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Essentials of Human Anatomy & Physiology

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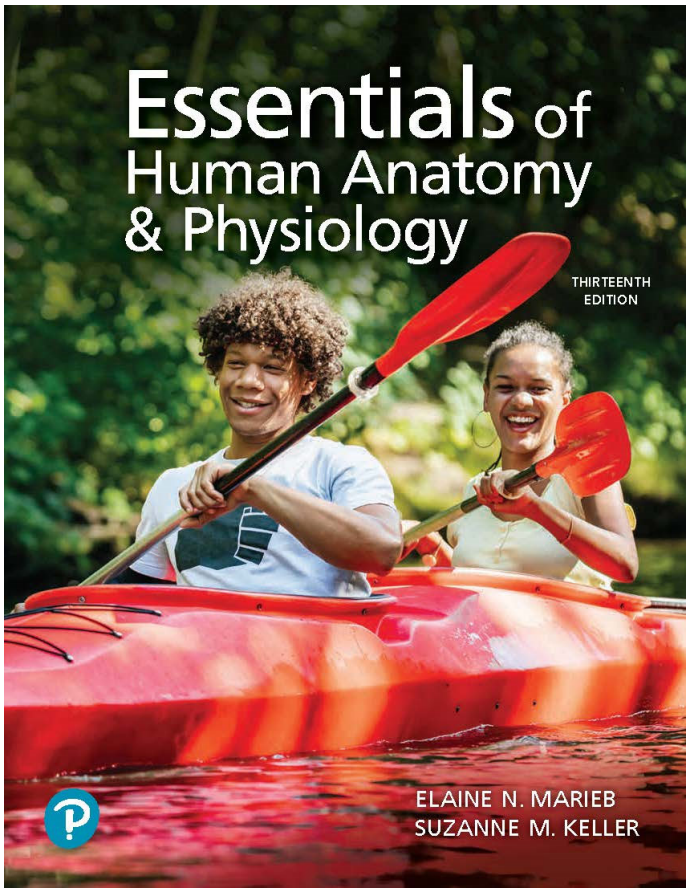

To the

Next Generation Science Standards Performance Expectations for High School Life Science

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NGSS Performance Expectations for High School Life Science

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NGSS Performance Expectations for High School Life Science	Essentials of Human Anatomy & Physiology 13th Edition ©2022
(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.	**SE/TE:** **Chapter 2: Basic Chemistry, pp. 23-59** Lesson 2.5: Biochemistry: The Chemical Composition of Living Matter, pp. 37–55 Lesson 2.5b: Organic Compounds, pp. 41-55 **Chapter 3: Cells and Tissues, pp. 60-105** Lesson 3.2: Anatomy of a Generalized Cell, pp. 61-74 Lesson 3.2b: The Nucleus, p.64 Lesson 3.3 Cell Physiology, pp. 74-86 Lesson 3.3c: Protein Synthesis, pp. 83-86
(HS-LS1-2) Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	**SE/TE:** **Chapter 1: The Human Body: An Orientation, pp. 1-22** Lesson 1.2: Levels of Structural Organization, pp. 2-7 Lesson 1.2a: From Atoms to Organisms, pp. 2-3 **Chapter 3: Cells and Tissues, pp. 60-105** Lesson 3.2: Anatomy of a Generalized Cell, pp. 61-73
(HS-LS1-3) Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	**SE/TE:** **Chapter 1: The Human Body: An Orientation, pp. 1-22** Lesson 1.5: Homeostasis, pp. 18-20
(HS-LS1-4) Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	**SE/TE:** Lesson 1.2a: From Atoms to Organisms, pp. 2-3 **Chapter 3: Cells and Tissues, pp. 60-105** Lesson 3.3 Cell Physiology, pp. 74-86 Lesson 3.3b: Cell Division, pp. 80-83
(HS-LS1-5) Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	For supporting content, please see: **SE/TE:** **Chapter 2: Basic Chemistry, pp. 23-59** Lesson 2.1: Concepts of Matter and Energy, pp. 23-25

SE = Student Edition **TE = Teacher Edition**

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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.	**SE/TE:** **Chapter 2: Basic Chemistry, pp. 23-59** Lesson 2.4: Chemical Bonds and Chemical Reactions, pp. 31-37 Lesson 2.4b: Patterns of Chemical Reactions, pp. 35-36 Lesson 2.5: Biochemistry: The Chemical Composition of Living Matter, pp. 37–55 Lesson 2.5b: Organic Compounds, pp. 41-55 **Chapter 3: Cells and Tissues, pp. 60-105** Lesson 3.3 Cell Physiology, pp. 74-86 Lesson 3.3c: Protein Synthesis, pp. 83-86
(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.	**SE/TE:** **Chapter 14: The Digestive System and Body Metabolism, pp. 460-510** Lesson 14.4: Metabolism, pp. 488-497 Lesson 14.4a: Carbohydrate, Fat, and Protein Metabolism in Body Cells, pp. 488-491
(HS-LS2) Ecosystems: Interactions, Energy, and Dynamics	
(HS-LS2-4) Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	For supporting content, please see: **SE/TE:** **Chapter 2: Basic Chemistry, pp. 23-59** Lesson 2.1: Concepts of Matter and Energy, pp. 23-25 **Chapter 14: The Digestive System and Body Metabolism, pp. 460-510** Lesson 14.4: Metabolism, pp. 488-497 Lesson 14.4a: Carbohydrate, Fat, and Protein Metabolism in Body Cells, pp. 488-491 Lesson 14.4c: Body Energy Balance, pp. 494-495
(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.	For supporting content, please see: **SE/TE:** **Chapter 13: The Respiratory System, pp** Lesson 13.2: Respiratory Physiology (Learning Objects only), p. 441 **Chapter 14: The Digestive System and Body Metabolism, pp. 460-510** Lesson 14.4a: Carbohydrate, Fat, and Protein Metabolism in Body Cells, pp. 488-491

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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.	**SE/TE:** **Chapter 2: Basic Chemistry, pp. 23-59** Lesson 2.5: Biochemistry: The Chemical Composition of Living Matter, pp. 37–55 Lesson 2.5b: Organic Compounds, pp. 41-55 **Chapter 16: The Reproductive System, pp. 540-579** Lesson 16.2: Male Reproductive Functions, pp. 545-549 Lesson 16.2a: Spermatogenesis, pp. 545-547
(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.	**SE/TE:** **Chapter 16: The Reproductive System, pp. 540-579** Lesson 16.2: Male Reproductive Functions, pp. 545-549 Lesson 16.2a: Spermatogenesis, pp. 545-547 Lesson 16.2b: Testosterone Production, pp. 547-549 Lesson 16.4: Female Reproductive Functions and Cycles, pp. 553-556 Lesson 16.4a: Oogenesis and the Ovarian Cycle, pp. 553-555
(HS-LS4) Biological Evolution: Unity and Diversity	
(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.	For supporting content, please see: **SE/TE:** **Chapter 16: The Reproductive System, pp. 540-579** Lesson 16.2: Male Reproductive Functions, pp. 545-549 Lesson 16.4: Female Reproductive Functions and Cycles, pp. 553-556