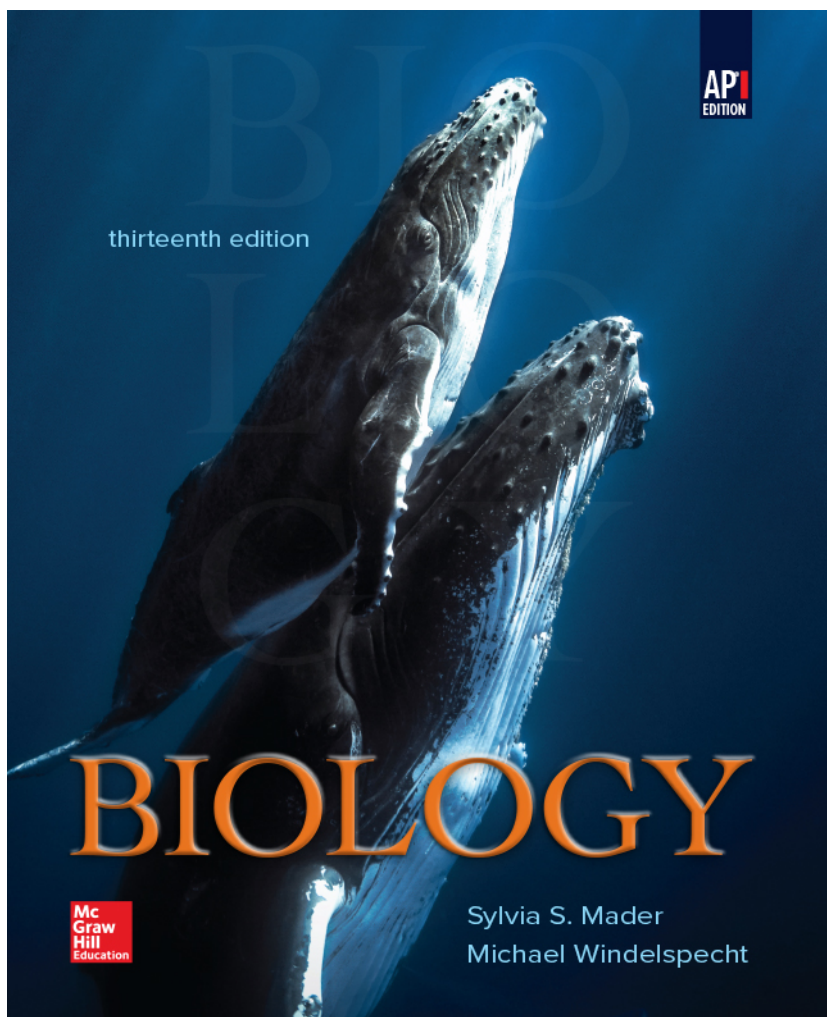


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Advanced Placement*

REVERSE CORRELATION GUIDE

Biology



By Sylvia Mader & Michael Windelspecht
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Advanced Placement Reverse Correlation (by chapter)
Biology, (13e)
 by Sylvia Mader & Michael Windelspecht

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12.2 Replication of DNA	1.1, 1.5, 6.1, 6.2, 6.7	IST-1.K.1, IST-1.K.2, IST-1.K.2a, IST-1.M.1, IST-1.M.1a, IST-1.M.1b, IST-1.M.1c, IST-1.M.1e, IST-1.M.1f, IST-1.M.1g, IST-4.A.1, SYI-1.A.1, SYI-1.C.1a, SYI-1.C.1b	1.C, 2.A, 2.B.b, 6.E.b
12.3 Gene Expression: RNA and the Genetic Code	1.1, 1.5, 2.1, 5.3, 6.1, 6.2, 6.3, 6.4, 7.6, 7.7	EVO-2.A.1, EVO-2.A.3, EVO-2.B.2, EVO-2.C.1, EVO-2.C.1b, EVO-2.C.1c, IST-1.K.1, IST-1.K.2, IST-1.K.2a, IST-1.L.1, IST-1.L.1b, IST-1.M.1, IST-1.N.1, IST-1.N.1a, IST-1.N.1b, IST-1.N.1c, IST-1.O.4b, IST-1.O.4c, IST-1.O.4d, SYI-1.A.1, SYI-1.C.1c, SYI-1.D.1	1.A, 1.C, 2.A, 2.B.b, 2.D.b, 4.B.a, 5.C, 6.E.a, 6.E.b, 6.E.c
12.4 Gene Expression: Transcription	1.1, 1.5, 2.1, 6.1, 6.2, 6.3, 6.4, 7.6, 7.7	EVO-2.B.1, EVO-2.B.2, EVO-2.C.1, EVO-2.C.1b, EVO-2.C.1c, IST-1.K.2, IST-1.K.2a, IST-1.L.1, IST-1.M.1, IST-1.N.1, IST-1.N.1a, IST-1.N.2, IST-1.N.3, IST-1.N.5, IST-1.N.6, IST-1.O.4e, SYI-1.A.1, SYI-1.C.1c, SYI-1.D.1	1.C, 2.A, 2.B.b, 2.D.b, 4.B.a, 6.E.a, 6.E.b

12.5 Gene Expression: Translation	6.1, 6.2, 6.3, 6.4, 7.6	EVO-2.B.1, EVO-2.B.2, IST-1.K.2, IST-1.K.2a, IST-1.M.1, IST-1.N.1, IST-1.N.1b, IST-1.N.1c, IST-1.N.2, IST-1.N.3, IST-1.N.4, IST-1.N.6a, IST-1.N.6b, IST-1.N.6c, IST-1.N.6d, IST-1.O.1, IST-1.O.2, IST-1.O.3, IST-1.O.4, IST-1.O.4a, IST-1.O.4b, IST-1.O.4c, IST-1.O.4e, IST-1.O.4g, IST-1.O.4h	1.C, 2.B.b, 2.D.b, 4.B.a, 6.E.a
Chapter 13: Regulation of Gene Expression	Unit 4: Cell Communication and Cell Cycle		
	Unit 6: Gene Expression and Regulation		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
13.1 Prokaryotic Regulation	4.2, 4.3, 4.4, 6.5, 6.6	IST-2.A.1, IST-2.B.1, IST-2.B.1a, IST-2.C.1, IST-2.C.2, IST-2.D.1, IST-3.D.1, IST-3.D.1a, IST-3.D.2, IST-3.D.2a, IST-3.D.2b, IST-3.E.1, IST-3.F.1, IST-3.G.1	1.A, 6.A, 6.B, 6.C, 6.E.b
13.2 Eukaryotic Regulation	4.2, 4.3, 4.4, 6.5, 6.6	IST-2.A.1, IST-2.A.2, IST-2.A.3b, IST-2.B.1, IST-2.B.1b, IST-2.C.1, IST-2.C.2, IST-2.D.1, IST-2.D.2, IST-3.D.1, IST-3.D.2, IST-3.D.2a, IST-3.D.2b, IST-3.E.1, IST-3.F.1, IST-3.G.1	1.A, 6.A, 6.B, 6.C, 6.E.b
13.3 Gene Mutations	4.4, 6.5, 6.7, 8.7	IST-2.A.3, IST-2.A.3a, IST-2.A.3b, IST-2.E.1, 2.E.1a, IST-2.E.1a.i, IST-2.E.1a.ii, IST-2.E.2, IST-3.G.1, IST-3.G.1a, IST-4.A.1, IST-4.A.1a, IST-4.B.1 (<i>illex</i>), SYI-3.C.3 (<i>illex</i>), EVO-1.O.2	2.C, 3.D, 6.A

Chapter 14: Biotechnology and Genomics	Unit 4: Cell Communication and Cell Cycle Unit 5: Heredity Unit 6: Gene Expression and Regulation		
	Topics	Essential Knowledge	Science Practices
14.1 DNA Technology	6.1, 6.8	IST-1.K.3, IST-1.P.1, IST-1.P.1a, IST-1.P.1b	1.C, 6.D
14.2 Biotechnology Products	4.4, 6.8	IST-1.P.1, IST-1.P.1c, IST-3.G.1	6.D, 6.E.b
14.3 Gene Therapy	4.4, 6.8	IST-1.P.1, IST-1.P.1c, IST-3.G.1	6.D, 6.E.b
14.4 Genomics	5.4, 6.7, 6.8	IST-1.J.1a, IST-1.P.1, IST-1.P.1d, IST-4.B.1a	2.C, 3.D, 5.A.b, 5.C, 6.D
Chapter 15: Darwin and Evolution	Unit 6: Gene Expression and Regulation Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
15.1 History of Evolutionary Thought	7.1, 7.2, 7.5, 7.6	EVO-1.C.2, EVO-1.D.1, EVO-1.D.2, EVO-1.E.1, EVO-1.L.2, EVO-1.N.1b	1.B, 1.C, 2.A, 4.B.b, 5.A.a
15.2 Darwin's Theory of Evolution	6.7, 7.1, 7.2, 7.3, 7.5, 7.6, 7.8, 7.12, 8.7	EVO-1.C.1, EVO-1.C.2, EVO-1.D.1, EVO-1.D.2, EVO-1.E.1, EVO-1.E.2, EVO-1.E.3, EVO-1.F.1, EVO-1.L.2, EVO-1.M.1, EVO-1.N.1, EVO-1.O.2, EVO-2.B.2, EVO-3.A.1, EVO-3.A.2, IST-4.A.1, IST-4.A.1a, IST-4.A.1b, IST-4.B.1, SYI-3.D.1, SYI-3.D.1b	1.B, 1.C, 2.A, 2.C, 3.D, 3.E.a, 4.B.a, 4.B.c, 5.A.a, 6.C
15.3 Evidence for Evolution	7.1, 7.2, 7.5, 7.6, 7.8, 8.7	EVO-1.C.2, EVO-1.D.1, EVO-1.D.2, EVO-1.E.1, EVO-1.E.2, EVO-1.L.2, EVO-1.M.1, EVO-1.N.1, EVO-1.N.1b, EVO-1.N.2, EVO-2.B.2, EVO-3.A.2, EVO-3.A.2a, EVO-3.A.2b, EVO-3.A.2c, SYI-2.C.1	1.B, 1.C, 2.A, 3.E.a, 4.B.a, 5.A.a

Chapter 16: How Populations Evolve	Unit 5: Heredity Unit 6: Gene Expression and Regulation Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
16.1 Genes, Populations, and Evolution	6.7, 7.1, 7.2, 7.4, 7.5, 7.6, 7.12, 8.1, 8.7	EVO-1.C.1, EVO-1.C.2, EVO-1.D.2, EVO-1.E.1, EVO-1.E.2, EVO-1.H.1, EVO-1.H.1a, EVO-1.H.1b, EVO-1.H.1b.i, EVO-1.H.1b.ii, EVO-1.H.1c, EVO-1.I.1, EVO-1.J.1, EVO-1.K.1, EVO-1.K.2, EVO-1.L.1, EVO-1.L.2, EVO-1.N.1, EVO-1.N.2, EVO-1.O.1, EVO-2.B.2, SYI-3.D.1, SYI-3.D.1a, SYI-3.D.1b, SYI-3.D.1c, IST-3.G.1, IST-3.G.2, IST-4.A.1b, IST-4.B.1, IST-5.A.2b (<i>illex</i>), SYI-3.B.1 (<i>illex</i>)	1.B, 1.C, 2.A, 2.C, 3.B, 3.D, 4.B.a, 5.A.a, 6.C, 6.E.c
16.2 Natural Selection	5.4, 6.7, 7.1, 7.2, 7.4, 7.5, 7.12, 8.1	EVO-1.C.1, EVO-1.C.2, EVO-1.D.1, EVO-1.D.2, EVO-1.E.2, EVO-1.E.3, EVO-1.H.1c, EVO-1.K.1, EVO-1.K.2, EVO-1.L.1, EVO-1.L.2, IST-1.J.3, IST-4.A.1b, IST-4.B.1, IST-5.A.2b, SYI-3.D.1c	1.B, 1.C, 2.A, 3.B, 5.A.a, 6.C
16.3 Maintenance of Diversity	5.5, 6.7, 7.1, 7.2, 7.4, 7.5, 7.12	EVO-1.C.1, EVO-1.C.2, EVO-1.D.1, EVO-1.D.2, EVO-1.E.2, EVO-1.E.3, EVO-1.H.1c, EVO-1.I.1, EVO-1.K.1, EVO-1.K.2, EVO-1.L.1, EVO-1.L.2, IST-4.A.1a, IST-4.B.1, SYI-3.B.1, SYI-3.D.1c	1.B, 1.C, 2.A, 2.C, 3.B, 3.D, 5.A.a, 6.C
Chapter 17: Speciation and Macroevolution	Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
17.1 How New Species Evolve	7.8, 7.10	EVO-3.A.1, EVO-3.A.2, EVO-3.A.2b, EVO-3.D.1, EVO-3.D.2, EVO-3.F.1, EVO-3.F.3	2.B.a, 3.E.a, 6.E.a

17.2 Modes of Speciation	7.3, 7.6, 7.8, 7.10	EVO-1.G.1, EVO-1.N.1, EVO-1.N.1b, EVO-1.N.2, EVO-3.A.1, EVO-3.A.2, EVO-3.A.2b, EVO-3.D.1, EVO-3.E.2, EVO-3.F.2, EVO-3.F.3	2.B.a, 3.E.a, 4.B.a, 4.B.c, 6.E.a
17.3 Principles of Macroevolution	7.4, 7.6, 7.7, 7.8, 7.10, 8.7	EVO-1.J.1, EVO-1.N.1, EVO-1.N.2, EVO-1.O.2, EVO-2.C.1, EVO-2.C.1a, EVO-2.C.1c, EVO-3.A.1, EVO-3.A.2, EVO-3.A.2a, EVO-3.A.2b, EVO-3.E.1, EVO-3.F.1, EVO-3.F.3 (<i>illex</i>)	2.B.a, 3.B, 3.E.a, 4.B.a, 6.E.a, 6.E.b
Chapter 18: Origin and History of Life	Unit 2: Cell Structure and Function		
	Unit 3: Cellular Energetics		
	Unit 7: Natural Selection		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
18.1 Origin of Life	7.13, 8.2	ENE-1.O.1, ENE-1.O.1b, SYI-3.E.1, SYI-3.E.1a, SYI-3.E.1a.i, SYI-3.E.1b, SYI-3.E.1b.i, SYI-3.E.1b.ii, SYI-3.E.1c, SYI-3.E.1c.i, SYI-3.E.1c.ii, SYI-3.E.2	3.B, 6.B
18.2 History of Life	2.3, 2.11, 3.5, 7.6, 7.11, 7.13, 8.2	ENE-1.I.1a.i, ENE-1.I.1a.ii, ENE-1.I.1a.iii, ENE-1.B.2d, ENE-1.M.1a, ENE-1.M.1c, EVO-1.A.1, EVO-1.B.1, EVO-1.M.1, EVO-1.N.1a, EVO-1.N.1a.i, EVO-1.N.1a.ii, EVO-1.N.1a.iii, EVO-3.G.1, SYI-3.E.1a, SYI-3.E.1a.i	2.D.a, 3.B, 4.B.a, 5.A.d, 6.B
18.3 Geological Factors That Influence Evolution	7.6, 7.11, 8.7	EVO-1.N.1a, EVO-1.N.1a.i, EVO-1.N.1a.ii, EVO-1.N.1a.iii, EVO-3.G.1, EVO-3.G.2, SYI-2.C.1	3.B, 4.B.a
Chapter 19: Taxonomy, Systematics, and Phylogeny	Unit 7: Natural Selection		
	Topics	Essential Knowledge	Science Practices
19.1 Systematic Biology	7.6	EVO-2.B.2	4.B.a
19.2 The Three-Domain System	7.6	EVO-1.M.1, EVO-1.N.1, EVO-2.B.2	4.B.a

19.3 Phylogeny	7.3, 7.6, 7.9	EVO-1.G.1, EVO-1.M.1, EVO-1.N.1, EVO-2.B.2, EVO-3.B.1, EVO-3.B.1a, EVO-3.B.1b, EVO-3.B.1b.i, EVO-3.B.1b.ii, EVO-3.B.1b.iii, EVO-3.B.1c, EVO-3.C.1, EVO-3.C.2, EVO-3.C.3	2.D.c, 4.B.a, 4.B.c
Chapter 20: Viruses, Bacteria, and Archaea	Unit 2: Cell Structure and Function		
	Unit 3: Cellular Energetics		
	Unit 6: Gene Expression and Regulation		
	Unit 7: Natural Selection		
	Topics	Essential Knowledge	Science Practices
20.1 Viruses, Viroids, and Prions	2.11, 6.4, 6.7, 7.8	EVO-1.A.2, EVO-3.A.1, EVO-3.A.2, EVO-3.A.2d, IST-1.O.5, IST-4.B.1b	2.C, 2.D.b, 3.D, 3.E.a, 6.B, 6.E.a
20.2 The Prokaryotes	2.11, 6.1, 6.7	EVO-1.A.2, IST-1.K.2b, IST-1.K.3, IST-4.B.1a, IST-4.B.1c	1.C, 2.C, 3.D, 6.B
20.3 The Bacteria	2.3, 3.5, 7.8	ENE-1.C.1, ENE-1.I.1a.i, ENE-1.I.1a.ii, ENE-1.I.1a.iii, EVO-3.A.2, EVO-3.A.2c	2.D.a, 3.E.a, 5.A.d, 6.B
20.4 The Archaea	2.3, 3.5	ENE-1.C.1, ENE-1.I.1a.i, ENE-1.I.1a.ii, ENE-1.I.1a.iii	2.D.a, 5.A.d, 6.B
Chapter 21: Protist Evolution and Diversity	Unit 2: Cell Structure and Function		
	Unit 6: Gene Expression and Regulation		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
21.1 General Biology of Protists	2.11	EVO-1.A.1, EVO-1.B.1	6.B
21.2 Supergroup Archaeplastida	2.3, 6.7	IST-4.B.1a, ENE-1.C.1	2.C, 2.D.a, 3.D, 5.A.d
21.3 Supergroup SAR	2.3	ENE-1.C.1	2.D.a, 5.A.d
21.4 Supergroup Excavata	2.8	ENE-2.I.2	4.A
21.5 Supergroups Amoebozoa and Opisthokonta	2.8, 8.7	ENE-2.I.2, SYI-2.B.2a	4.A

Chapter 22: Fungi Evolution and Diversity	Unit 2: Cell Structure and Function		
	Unit 4: Cell Communication and Cell Cycle		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
22.1 Evolution and Characteristics of Fungi	2.5	ENE-2.D.2	3.D, 5.D.b
22.2 Diversity of Fungi	8.2, 8.7	ENE-1.M.1b, SYI-3.D.1 (<i>illex</i>), SYI-2.B.2a	
22.3 Symbiotic Relationships of Fungi	4.3	IST-3.F.1, SYI-3.B.1 (<i>illex</i>)	6.C
Chapter 23: Plant Evolution and Diversity	Unit 7: Natural Selection		
	Topics	Essential Knowledge	Science Practices
23.1 Ancestry and Features of Land Plants			
23.2 Evolution of Bryophytes: Colonization of Land			
23.3 Evolution of Lycophytes: Vascular Tissue			
23.4 Evolution of Pteridophytes: Megaphylls			
23.5 Evolution of Seed Plants: Full Adaptation to Land	7.3, 8.1	EVO-1.F.1, IST-5.A.2a, IST-5.A.2b; IST-5.A.3	4.B.c
Chapter 24: Flowering Plants: Structure and Organization	Unit 2: Cell Structure and Function		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
24.1 Cells and Tissues of Flowering Plants	8.2	ENE-1.B.2d (<i>illex</i>), ENE-1.M.1b	6.D
24.2 Organs of Flowering Plants	2.3, 8.1, 8.2	ENE-1.C.1; ENE-1.M.1b; ENE-3.D.1	2.D.a, 5.A.d, 6.D
24.3 Organization and Diversity of Roots	2.3	ENE-1.C.1	2.D.a, 5.A.d
24.4 Organization and Diversity of Stems			
24.5 Organization and Diversity of Leaves			
Chapter 25: Flowering Plants: Nutrition and Transport	Unit 1: Chemistry of Life		
	Unit 2: Cell Structure and Function		
	Topics	Essential Knowledge	Science Practices
25.1 Plant Nutrition and Soil	1.2	ENE-1.A.1	2.A
25.2 Water and Mineral Uptake	1.2, 2.3, 2.8	ENE-1.A.1, ENE-1.C.1, ENE-2.H.1a, ENE-2.I.1	2.A, 2.D.a, 4.A, 5.A.d
25.3 Transport Mechanisms in Plants	1.1, 2.3, 2.8	ENE-1.B.2b, ENE-1.C.1, ENE-2.H.1a, ENE-2.I.1, ENE-2.I.2, SYI-1.A.3	2.A, 2.D.a, 4.A, 5.A.d

Chapter 26: Flowering Plants: Control of Growth Responses	Unit 3: Cellular Energetics		
	Unit 4: Cell Communication and Cell Cycle		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
26.1 Plant Hormones	3.7, 4.1, 4.2, 4.3, 4.5, 8.1	ENE-3.C.1, ENE-3.D.2, IST-3.B.1, IST-3.B.1a, IST-3.C.1, IST-3.C.2, IST-3.F.1, SYI-3.A.1, SYI-3.A.2	1.A, 1.B, 6.C, 6.E.b
26.2 Plant Growth and Movement Responses	3.7, 4.1, 4.3, 8.1	ENE-3.D.1; EVO-1.E.2 (<i>illex</i>), IST-3.B.1, IST-3.B.1a, IST-5.A.3, IST-3.F.1, SYI-3.A.2	1.B, 6.C
26.3 Plant Responses to Phytochrome	3.7, 8.1	IST-5.A.1, EVO-1.E.2 (<i>illex</i>), SYI-3.A.2	6.C
Chapter 27: Flowering Plants: Reproduction	Unit 3: Cellular Energetics		
	Unit 6: Gene Expression and Regulation		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
27.1 Sexual Reproductive Strategies	3.7, 8.1	SYI-3.A.2; ENE-3.D.1	6.C
27.2 Seed Development			
27.3 Fruit Types and Seed Dispersal			
27.4 Asexual Reproductive Strategies	6.7, 8.2	IST-4.B.1c, ENE-1.M.1b	2.C, 3.D
Chapter 28: Invertebrate Evolution	Unit 2: Cell Structure and Function		
	Unit 4: Cell Communication and Cell Cycle		
	Unit 6: Gene Expression and Regulation		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
28.1 Evolution of Animals	4.3	IST-1.J.2 (<i>illex</i>), IST-3.F.1	6.C
28.2 The Simplest Invertebrates	2.3, 8.2	ENE-1.C.1, ENE-1.M.1b	2.D.a, 5.A.d
28.3 Diversity Among the Spiralian	2.3, 8.2	ENE-1.C.1, ENE-1.M.1b	2.D.a, 5.A.d
28.4 Diversity of the Ecdysozoans	2.3, 6.7	ENE-1.C.1, IST-4.A.1	2.C, 2.D.a, 3.D, 5.A.d
28.5 Invertebrate Deuterostomes			
Chapter 29: Vertebrate Evolution	Unit 7: Natural Selection		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
29.1 The Chordates	7.6, 7.7, 7.9	EVO-1.M.1, EVO-2.B.1, EVO-2.B.2, EVO-3.B.1a, EVO-3.C.1	2.D.c, 4.B.a
29.2 The Vertebrates			
29.3 The Fishes			

29.4 The Amphibians	8.2	ENE-1.M.1aii, ENE-1.M.1b	
29.5 The Reptiles	8.2	ENE-1.M.1aii	
29.6 The Mammals	7.10, 8.2	EVO-3.E.2, ENE-1.M.1ai	2.B.a, 6.E.a
Chapter 30: Human Evolution	Unit 7: Natural Selection		
	Topics	Essential Knowledge	Science Practices
30.1 Evolution of Primates	7.9	EVO-3.B.1a, EVO-3.B.1c, EVO-3.C.1	2.D.c
30.2 Evolution of Humanlike Hominids			
30.3 Evolution of Early Genus <i>Homo</i>			
30.4 Evolution of Later Genus <i>Homo</i>	7.11	EVO-3.H.1	3.B
Chapter 31: Animal Organization and Homeostasis	Unit 4: Cell Communication and Cell Cycle		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
31.1 Types of Tissues			
31.2 Organs, Organ Systems, and Body Cavities			
31.3 The Integumentary System			
31.4 Homeostasis	4.4, 4.5, 8.1	ENE-3.A.1, ENE-3.B.1, ENE-3.C.1, ENE-3.D.1, IST-3.G.1,	6.E.b
Chapter 32: Circulation and Cardiovascular Systems	Unit 7: Natural Selection		
	Topics	Essential Knowledge	Science Practices
32.1 Transport in Invertebrates			
32.2 Transport in Vertebrates			
32.3 The Human Cardiovascular System	7.8	EVO-3.A.1	3.E.a
32.4 Blood	7.8	SYI-3.A.1, SYI-3.A.2 (<i>ilex</i>)	3.E.a
Chapter 33: The Lymphatic and Immune Systems	Unit 3: Cellular Energetics		
	Unit 4: Cell Communication and Cell Cycle		
	Topics	Essential Knowledge	Science Practices
33.1 Evolution of Immune Systems			
33.2 The Lymphatic System			
33.3 Innate Immune Defenses	3.7, 4.1, 4.2	IST-3.A.1a, IST-3.B.1a, IST-3.C.2, SYI-3.A.1, SYI-3.A.2	1.A, 1.B, 6.C
33.4 Adaptive Immune Defenses	3.7, 4.1, 4.2, 4.3	IST-3.A.1a, IST-3.B.1a, IST-3.C.2, IST-3.E.1, IST-3.F.1, SYI-3.A.1, SYI-3.A.2	1.A, 1.B, 6.C
33.5 Immune System Disorders and Hypersensitivity Reactions	4.1, 4.2, 4.3	IST-3.B.1a, IST-3.C.2, IST-3.F.1	1.A, 1.B, 6.C

Chapter 34: Digestive Systems and Nutrition	Unit 1: Chemistry of Life Unit 2: Cell Structure and Function		
	Topics	Essential Knowledge	Science Practices
34.1 Digestive Tracts	1.2, 2.3	ENE-1.A.1, ENE-1.C.1	2.A, 2.D.a, 5.A.d
34.2 The Human Digestive System	2.3	ENE-1.B.2b, ENE-1.B.2c, ENE-1.B.2d (<i>illex</i>), ENE-1.C.1	2.D.a, 5.A.d
34.3 Digestive Enzymes	2.3	ENE-1.C.1	2.D.a, 5.A.d
34.4 Nutrition and Human Health	1.2	ENE-1.A.1	2.A
Chapter 35: Respiratory Systems	Unit 4: Cell Communication and Cell Cycle		
	Topics	Essential Knowledge	Science Practices
35.1 Gas-Exchange Surfaces			
35.2 Breathing and Transport of Gases			
35.3 Respiration and Human Health	4.4	IST-2.E.1 (<i>illex</i>), IST-3.G.1a	6.E.b
Chapter 36: Body Fluid Regulation and Excretory Systems	Unit 2: Cell Structure and Function		
	Topics	Essential Knowledge	Science Practices
36.1 Animal Excretory Systems	2.8	ENE-2.I.2	4.A
36.2 The Human Urinary System	2.8	ENE-2.I.2	4.A
Chapter 37: Neurons and Nervous Systems	Unit 3: Cellular Energetics Unit 4: Cell Communication and Cell Cycle Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
37.1 Evolution of the Nervous System	3.7, 8.1	SYI-3.A.1, IST-5.A.1, IST-5.A.2, IST-5.A.3	6.C
37.2 Nervous Tissue	3.7, 4.1, 4.2, 4.4, 7.8	EVO-3.A.1, IST-3.B.1, IST-3.D.2c, IST-3.G.2, SYI-3.A.1	1.A, 1.B, 3.E.a, 6.C, 6.E.b
37.3 The Central Nervous System	3.7	SYI-3.A.2	6.C
37.4 The Peripheral Nervous System			

Chapter 38: Sense Organs	Unit 4: Cell Communication and Cell Cycle		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
38.1 Sensory Receptors	4.1, 8.1	IST-3.B.1a, IST-5.A.1, IST-5.A.2, IST-5.A.2b	1.B, 3.C.a
38.2 Chemical Senses	4.1	IST-3.B.1a	1.B
38.3 Sense of Vision	4.2	IST-3.C.2	1.A
38.4 Senses of Hearing and Equilibrium			
38.5 Somatic Senses			
Chapter 39: Locomotion and Support Systems			
39.1 Diversity of Skeletons			
39.2 The Human Skeletal System			
39.3 The Muscular System			
Chapter 40: Hormones and Endocrine Systems	Unit 3: Cellular Energetics		
	Unit 4: Cellular Communication and Cell Cycle		
	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
40.1 Animal Hormones	3.7, 4.2, 4.3	IST-3.D.1, IST-3.D.2, IST-3.D.2b, IST-3.E.1, IST-3.F.1, SYI-3.A.1, SYI-3.A.2	1.A, 6.C
40.2 Hypothalamus and Pituitary Gland	4.5, 8.1	ENE-3.B.1, ENE-3.C.1, ENE-3.D.1, IST-3.B.1a (<i>illex</i>)	6.E.b
40.3 Other Endocrine Glands and Hormones	4.5, 8.1	ENE-3.B.1, ENE-3.D.1, ENE-3.D.2, IST-3.B.1a (<i>illex</i>)	6.E.b
Chapter 41: Reproductive Systems	Unit 4: Cell Communication and Cell Cycle		
	Unit 6: Gene Expression and Regulation		
	Topics	Essential Knowledge	Science Practices
41.1 How Animals Reproduce	6.7	IST-4.B.1c	2.C, 3.D
41.2 Human Male Reproductive Systems	4.1	IST-3.B.1a	1.B
41.3 Human Female Reproductive System	4.1	IST-3.B.1a	1.B
41.4 Control of Human Reproduction			
41.5 Sexually Transmitted Diseases			

Chapter 42: Animal Development and Aging	Unit 4: Cell Communication and Cell Cycle Unit 5: Heredity		
	Topics	Essential Knowledge	Science Practices
42.1 Early Developmental Stages	5.6	SYI-3.C.1	6.E.b
42.2 Developmental Processes	4.1, 4.3	IST-3.B.1, IST-3.E.1	1.B, 6.3
42.3 Human Embryonic and Fetal Development	4.1, 4.3	IST-3.B.1a, IST-3.E.1	1.B, 6.3
42.4 The Aging Process	4.1, 4.4	IST-3.B.1a, IST-3.G.2	6.E.b
Chapter 43: Behavioral Ecology	Unit 3: Cellular Energetics Unit 4: Cell Communication and Cell Cycle Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
43.1 Inheritance Influences Behavior	8.1	ENE -3.D.1; IST-5.A.1	3.C.a
43.2 The Environment Influences Behavior	4.4, 8.1	ENE -3.D.1; IST-3.G.1a, IST-5.A.1, IST-5.A.2, IST-5.A.3a	3.C.a, 6.E.b
43.3 Animal Communication	3.7, 8.1	ENE -3.D.1; ENE-3.D.2, SYI-3.A.1, IST-5.A.1, IST-5.A.2a, IST-5.A.2b, IST-5.A.3a, IST-5.A.3b	3.C.a, 6.C
43.4 Behaviors That Increase Fitness	3.7, 8.1, 8.2, 8.5	ENE-1.M.1b, ENE-1.M.1d ENE -3.D.1; ENE-4.B.2, SYI-3.A.1, IST-5.A.3	3.C.a, 6.C
Chapter 44: Population Ecology	Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
44.1 Scope of Ecology	8.3	SYI-1.G.1	4.A
44.2 Demographics of Populations	8.2, 8.3	SYI-1.G.2ai, SYI-1.H.2, ENE-1.N.1, ENE-1.N.2a	4.A, 6.D
44.3 Population Growth Models	8.2, 8.3, 8.4	ENE-1.M.1, SYI-1.G.2, SYI-1.G.2a, SYI-1.G.ai, SYI-1.H.1, SYI-1.H.2	4.A, 5.A.c, 6.D
44.4 Regulation of Population Size	8.2, 8.3, 8.4, 8.5	ENE-1.N.1, SYI-1.G.2, SYI-1.H.1, SYI-1.H.2, ENE-4.B.1, ENE-4.B.2, ENE-4.B.3, ENE-4.B.4	4.A, 5.A.c, 5.B, 6.D
44.5 Life History Patterns	8.3	SYI-1.G.2	4.A
44.6 Human Population Growth	7.11, 8.7	EVO-3.H.1, SYI-2.B.2	3.B, 5.D.a, 5.D.b

Chapter 45: Community and Ecosystem Ecology	Unit 1: Chemistry of Life Unit 2: Cell Structure and Function Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
45.1 Ecology of Communities	2.3, 7.11, 8.1, 8.2, 8.5, 8.6	ENE-1.C.1, ENE-1.M.1.b, EVO-3.I.1, EVO-3.J.1, ENE-3.D.2, ENE-4.A.1, ENE-4.B.1, ENE-4.B.3, ENE-4.B.4, ENE-4.C.1, IST-5.A.1, IST-5.A.2b, IST-5.A.3, IST-5.A.3b, SYI-1.F.2	2.D.a, 3.B, 5.A.d, 5.B
45.2 Community Development	2.3, 8.5, 8.7	ENE-1.C.1, ENE-4.B.1, ENE-4.B.3, SYI-2.B.2	3.B, 5.D.a, 5.D.b
45.3 Dynamics of an Ecosystem	1.2, 2.3, 8.2, 8.5	ENE-1.A.1, ENE-1.C.1, ENE-1.M.1, ENE-1.N.1, ENE-1.N.2, ENE-1.N.2a, ENE-1.N.2b, ENE-1.O.1, ENE-1.O.1b, ENE-1.O.2, ENE-4.B.1, ENE-4.B.3, ENE-4.B.4, ENE-4.C.1	2.A, 3.B, 6.D
45.4 Ecological Consequences of Climate Change	1.2, 8.7	ENE-1.A.1, SYI-2.B.1, SYI-2.B.2b	2.A, 5.D.a, 5.D.b
Chapter 46: Major Ecosystems of the Biosphere	Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
46.1 Climate and the Biosphere	8.7	SYI-2.B.1, SYI-2.C.1	5.D.a, 5.D.b
46.2 Terrestrial Ecosystems	8.7	SYI-2.B.1, SYI-2.C.1	5.D.a, 5.D.b
46.3 Aquatic Ecosystems	8.2, 8.7	ENE-1.N.2a, SYI-2.C.1	6.D
Chapter 47: Conservation of Biodiversity	Unit 4: Cell Communication and Cell Cycle Unit 6: Gene Expression and Regulation Unit 7: Natural Selection Unit 8: Ecology		
	Topics	Essential Knowledge	Science Practices
47.1 Conservation Biology and Biodiversity	8.6, 8.7	SYI-2.B.2a, SYI-2.B.2b, SYI-3.F.1	6.E.c
47.2 Value of Biodiversity	6.7, 7.8, 8.6	EVO-1.E.3 (<i>illex</i>), EVO-3.A.2c, IST-4.B.1, SYI-3.F.1	2.C, 3.D, 3.E.a, 6.E.c
47.3 Causes of Extinction	4.4, 7.11, 8.6, 8.7	EVO-3.G.1, EVO-3.G.2, EVO-3.H.1, IST-3.G.1, IST-3.G.2, SYI-2.A.1, SYI-2.A.2, SYI-2.B.2a, SYI-2.B.2b, SYI-3.F.1	3.B, 5.D.a, 5.D.b, 6.E.b, 6.E.c
47.4 Conservation Techniques	8.6	SYI-3.F.1, SYI-3.F.2, SYI-3.G.2	6.E.c

