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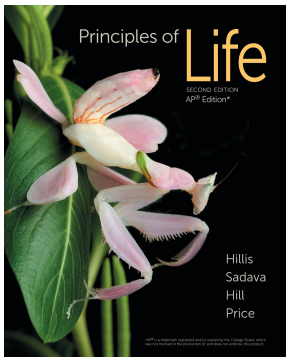
2019 AP® Biology Course Framework Alignment to *Principles of Life for the AP® Course*, 2nd edition



CF Topic Number & Big Idea	2019 Course Framework Topic Title	*Principles of Life* Second Edition Chapter/Section
1.1 Systems Interactions	Structure of Water and Hydrogen Bonding	Concepts 2.1, 2.2
1.2 Energetics	Elements of Life	Concepts 2.2, 2.3, 2.4, 2.5, 3.1, 3.2
1.3 Systems Interactions	Introduction to Biological Macromolecules	Concept 2.2
1.4 Systems Interactions	Properties of Biological Macromolecules	Concepts 2.2, 2.3, 2.4, 3.1, 3.2
1.5 Systems Interactions	Structure and Function of Biological Macromolecules	Concepts 2.3, 2.4, 3.1, 3.2, 9.1, 9.2,
1.6 Information Storage and Transfer	Nucleic Acids	Concept 3.1
2.1 Systems Interactions	Cell Structure: Subcellular Components	Concepts 4.2, 4.3
2.2 Systems Interactions	Cell Structure and Function	Concepts 4.3, 4.4, 6.1, 6.2, 6.5, 6.6
2.3 Energetics *Math Alert: Perform Mathematical calculations: including ratios*	Cell Size	Concepts 4.1, 4.3
2.4 Energetics	Plasma Membranes	Concept 5.1
2.5 Energetics	Membrane Permeability	Concepts 5.1, 5.2, 4.5
2.6 Energetics	Membrane Transport	Concepts 5.2, 5.3, 5.4
2.7 Energetics	Facilitated Diffusion	Concepts 5.2, 5.3, 34.2
2.8 Energetics *Math Alert: Water Potential Equation*	Tonicity and Osmoregulation	Concepts 5.2, 25.3, 36.1

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2.9 Energetics	Mechanisms of Transport	Concepts 5.1, 5.2, 5.3, 5.4
2.10 Energetics	Cell Compartmentalization	Concepts 4.1, 4.3
2.11 Evolution	Origins of Cell Compartmentalization	Concept 4.2, 4.3, 20.1
3.1 Energetics	Enzyme Structure	Concept 3.3
3.2 Energetics	Enzyme Catalysis	Concept 3.4
3.3 Energetics *Math Alert: students should know pH scale is logarithmic…don't need to apply the log equation*	Environmental Impacts on Enzyme Function	Concept 3.4
3.4 Energetics	Cellular Energy	Concepts 3.3, 6.1, 6.2, 6.4
3.5 Energetics	Photosynthesis	Concepts 6.4, 6.5, 6.6
3.6 Energetics	Cellular Respiration	Concepts 6.1, 6.2, 6.3, 6.4
3.7 Systems Interactions	Fitness	Concept 5.1 (variation in membrane components), 6.5 (variation in plant pigments), 12.3 (gene families), 15.6 (types of hemoglobin)
4.1 Information Storage and Transfer	Cell Communication	Concepts 4.5, 5.5, 5.6
4.2 Information Storage and Transfer	Introduction to Signal Transduction	Concepts 5.5, 5.6
4.3 Information Storage and Transfer	Signal Transduction	Concept 5.5, 5.6, 7.5, 14.2, 34.4
4.4 Information Storage and Transfer	Changes in Signal Transduction Pathways	Concepts 5.5, 5.6
4.5 Energetics	Feedback	Concepts 1.2, 3.4, 6.4, 29.6
4.6 Information Storage and Transfer	Cell Cycle	Concepts 7.2, 7.3
4.7 Information Storage and Transfer	Regulation of Cell Cycle	Concept 7.3, 7.5
5.1 Information Storage and Transfer	Meiosis	Concept 7.4
5.2 Information Storage and Transfer	Meiosis and Genetic Diversity	Concept 7.4

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5.3 Evolution and Information Storage and Transfer *Math Alert: Probability and Chi Square*	Mendelian Genetics	Concepts 4.3, 6.1, 7.1, 8.1, 9.1, 10.3
5.4 Information Storage and Transfer *Math Alert: Probability and Chi Square*	Non-Mendelian Genetics	Concepts 8.2, 8.3
5.5 Systems Interactions	Environmental Effects on Phenotype	Concepts 8.2, 29.5
5.6 Systems Interactions	Chromosomal Inheritance	Concept 7.4, 8.1
6.1 Information Storage and Transfer	DNA and RNA Structure	Concepts 3.1, 8.4, 9.1
6.2 Information Storage and Transfer	Replication	Concept 9.2
6.3 Information Storage and Transfer	Transcription and RNA Processing	Concepts 10.1, 10.2, 10.4
6.4 Information Storage and Transfer	Translation	Concepts 10.3, 10.4, 11.2
6.5 Information Storage and Transfer	Regulation of Gene Expression	Concepts 11.1, 11.2, 11.3, 11.4
6.6 Information Storage and Transfer	Gene Expression and Cell Specialization	Concepts 11.1, 11.2
6.7 Information Storage and Transfer	Mutations	Concepts 7.4, 8.2, 9.3, 10.3, 10.4, 15.2
6.8 Information Storage and Transfer	Biotechnology	Concepts 13.1, 13.2, 13.3, 13.4
7.1 Evolution	Introduction to Natural Selection	Concepts 1.4, 15.1, 15.2
7.2 Evolution	Natural Selection	Concepts 1.4, 14.4, 14.5, 15.1, 15.2, 15.4, 15.5
7.3 Evolution	Artificial Selection	Concepts 15.2, 16.1, 16.2
7.4 Evolution	Population Genetics	Concepts 15.2, 15.4, 15.5, 15.6
7.5 Evolution *Math Alert: Hardy-Weinberg equation*	Hardy-Weinberg Equilibrium	Concepts 15.1, 15.3

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7.6 Evolution	Evidence of Evolution	Concepts 1.4, 15.1, 15.5, 16.1, 16.2, 16.3, 18.1, 18.2, 18.3
7.7 Evolution	Common Ancestry	Concepts 1.4, 15.5, 16.1, 16.2
7.8 Evolution	Continuing Evolution	Concepts 1.4, 14.1, 14.4, 14.5, 15.2, 15.5, 15.7, 16.1, 43.4
7.9 Evolution	Phylogeny	Concepts 16.1, 16.2, 16.3, 16.4, 41.4
7.10 Evolution	Speciation	Concepts 17.1, 17.2, 17.3, 17.4, 18.3
7.11 Evolution	Extinction	Concepts 18.2, 18.3, 41.5, 44.2, 44.5
7.12 Systems Interactions	Variations in Populations	Concepts 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 44.3
7.13 Systems Interactions	Origin of Life on Earth	Concept 1.1, 1.4, 2.5, 18.1, 18.3, 19.1, 19.2
8.1 Energetics Information Storage and Transfer	Responses to the Environment	Concepts 11.3, 15.1, 15.2, 15.4, 15.5, 15.6, 40.1, 40.2, 40.3, 40.5, 40.6,
8.2 Energetics	Energy Flow Through Ecosystems	Concepts 29.1, 29.2, 29.3, 43.2, 43.3, 44.1, 44.3
8.3 Systems Interactions *Math Alert: Population growth & exponential growth equation*	Population Ecology	Concepts 42.1, 42.2, 42.3, 42.4
8.4 Systems Interactions *Math Alert: logistic growth model*	Effect of Density of Populations	Concepts 42.1, 42.2
8.5 Energetics *Math Alert: Simpson's Diversity Index*	Community Ecology	Concepts 44.1, 44.2, 44.3, 44.4, 44.5
8.6 Systems Interactions	Biodiversity	Concepts 41.1, 43.1, 43.2, 43.3, 43.4, 44.1, 44.2, 45.1
8.7 Evolution Systems Interactions	Disruptions to Ecosystems	Concepts 15.2, 41.3, 41.5, 43.3, 44.1, 44.2, 44.3, 45.1, 45.2, 45.3, 45.4, 45.5, 45.6