

**Goal 1**

Courses and Activities Mapped to Goal 1: Develop knowledge and understanding of core content in biology

1: Illustrate and examine relationships among organisms				2: Explain and illustrate the basic structure and function of cells.							3: Explain and illustrate normal physiology of organisms			4: Explain and illustrate growth and behavior of organisms				5: Explain and illustrate energy and matter in biology					6: Explain and illustrate living organisms		
1: Illustrate and examine phylogenetic relationships among organisms, and characterize and differentiate the evolutionary processes that yield such relationships.				2: Explain and illustrate the basic structure and function of cells.							3: Explain and illustrate how the normal physiology of organisms functions in different taxa to maintain homeostasis in various environments.			4: Explain and illustrate how the growth and behavior of organisms are activated and regulated through the expression of genetic information in context.				5: Explain and illustrate the pathways and transformations of energy and matter in biological systems.					6: Explain and illustrate how living organisms are interconnected and interacting at multiple functional scales.		
<b>1.1: Apply concepts of natural selection and evolution</b> Apply concepts of natural selection and evolution in understanding any aspect of biology, ranging from genes to speciation.	<b>1.2: Map key events in biological evolution</b> Map key events in biological evolution onto the broad phylogenetic tree of life.	<b>1.3: Summarize biological information in the context of phylogenetic trees.</b> Summarize biological information in the context of phylogenetic trees.	<b>1.4: Construct a basic phylogenetic tree from biological data.</b> Construct a basic phylogenetic tree from biological data.	<b>2.1: Explain cell functions.</b> Explain how internal membranes and organelles contribute to cell functions.	<b>2.2: Describe the molecular properties of cell membranes</b> Describe the molecular properties of cell membranes, and relate these properties to the selective permeability of membranes.	<b>2.3: Explain how cell size/shape affect nutrient intake</b> Explain how cell size and shape affect the overall rate of nutrient intake and the rate of waste elimination.	<b>2.4: Explain how cells use energy to maintain homeostasis</b> Explain how cellular molecules and organelles generate and utilize energy in cells to maintain homeostasis.	<b>2.5: Explain the differences between cells</b> Explain the differences between prokaryotic and eukaryotic cells with regard to macromolecules, membranes, and organelles, and evaluate the significance of these differences.	<b>2.6: Explain mitotic and meiotic division</b> Explain mitotic and meiotic division, and regulation of cell growth.	<b>2.7: Explain and illustrate how cells respond to their internal and external environments.</b> Explain and illustrate how cells respond to their internal and external environments.	<b>3.1: Explain functional units</b> Explain how functional units at different levels of biological organization permit diverse organisms to maintain relatively constant internal environments.	<b>3.2: Explain how organisms sense and respond</b> Explain how organisms sense and respond to their external environment.	<b>3.3: Compare and contrast the differences in physiology</b> Compare and contrast the differences in physiology among organisms, both within and between taxa, that allow them to cope with differences in their abiotic and biotic environments.	<b>4.1: Explain the relationship between phenotype and genotype</b> Explain and illustrate the relationship between phenotype and genotype.	<b>4.2: Explain various modes of genetic action</b> Explain and illustrate the various modes of genetic action, including Mendelian genetics, quantitative genetics, and epigenetics.	<b>4.3: Explain the applications of genomics</b> Explain and illustrate the applications of genomics in science and society.	<b>4.4: Explain how genetic information is stored and expressed</b> Explain and illustrate how genetic information is stored and expressed.	<b>5.1: Describe the structure and function of molecules</b> Describe the structure and function of biological molecules, including carbohydrates, proteins, and lipids, that are involved in anabolic and catabolic processes in living organisms.	<b>5.2: Describe pathways involved in photosynthesis.</b> Describe the regulation of pathways involved in photosynthesis.	<b>5.3: Describe pathways involved in cellular respiration</b> Describe the regulation of pathways involved in cellular respiration and explain how these pathways utilize energy from carbohydrates, proteins, and lipids.	<b>5.4: Explain how grow and reproduce</b> Explain how biological systems use free energy and nutrient availability to grow and reproduce.	<b>5.5: Predict how changes affect organisms</b> Predict how changes in free energy affect organisms, populations, and ecosystems.	<b>6.1: Interpret coevolutionary and symbiotic relationships</b> Interpret coevolutionary and symbiotic relationships and illustrate mutualism, antagonism and commensalism.	<b>6.2: Describe ecological interactions</b> Examine and describe ecological interactions within and between populations and species, including competitive and exploitative relationships.	<b>6.3: Describe generation &amp; maintenance of biological divers</b> Describe and explain the generation and maintenance of biological diversity, and its role in ecosystem function.

Courses and Learning Activities																								
BIO 101 Principles of Biology I																								
BIO 101 L Principles of Biology I Laboratory																								
BIO 102 Principles of Biology II																								
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BIO 330 L General Physiology Laboratory																								
BIO 350 L Laboratory in Ecology and Evolution																								
BIO 374 L Cellular and Microbial Biology Laboratory																								
BIO 380 L Genetics																								
BIO 408 L General Immunology Laboratory																								
BIO 417 Cellular and Molecular Biology I																								
BIO 418 Cellular and Molecular Biology II																								
BIO 426 Ornithology																								
BIO 427 L Plant Taxonomy Laboratory																								
BIO 428 L Mammology Laboratory																								
BIO 431 General Endocrinology																								
BIO 432 Vertebrate Physiology																								
BIO 433 Reproductive Physiology																								
BIO 437 Plant Physiology																								
BIO 437 L Plant Physiology Laboratory																								
BIO 445 Plant Anatomy																								
BIO 447 Comparative Morphology of Vascular Plants																								
BIO 450 Advanced Ecology																								
BIO 454 Animal Behavior																								

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	1: Illustrate and examine phylogenetic relationships among organisms, and characterize and differentiate the evolutionary processes that yield such relationships.				2: Explain and illustrate the basic structure and function of cells.							3: Explain and illustrate how the normal physiology of organisms functions in different taxa to maintain homeostasis in various environments.			4: Explain and illustrate how the growth and behavior of organisms are activated and regulated through the expression of genetic information in context.				5: Explain and illustrate the pathways and transformations of energy and matter in biological systems.					6: Explain and illustrate how living organisms are interconnected and interacting at multiple functional scales.		
	1.1: Apply concepts of natural selection and evolution	1.2: Map key events in biological evolution	1.3: Summarize biological information in the context of phylogenetic trees.	1.4: Construct a basic phylogenetic tree from biological data.	2.1: Explain cell functions.	2.2: Describe the molecular properties of cell membranes	2.3: Explain how cell size and shape affect nutrient intake	2.4: Explain how cells use energy to maintain homeostasis.	2.5: Explain the differences between cells	2.6: Explain mitotic and meiotic division	2.7: Explain and illustrate how cells respond to their internal and external environments.	3.1: Explain functional units	3.2: Explain how organisms sense and respond to their external environment.	3.3: Compare and contrast the differences in physiology	4.1: Explain the relationship between phenotype and genotype.	4.2: Explain various modes of genetic action	4.3: Explain the applications of genomics in science and society.	4.4: Explain how genetic information is stored and expressed.	5.1: Describe the structure and function of molecules	5.2: Describe pathways involved in photosynthesis.	5.3: Describe pathways involved in cellular respiration	5.4: Explain how biological systems use free energy and nutrient availability to grow and reproduce.	5.5: Predict how changes affect organisms	6.1: Interpret coevolutionary and symbiotic relationships	6.2: Describe ecological interactions	6.3: Describe generation & maintenance of biological diversity
BIO 475 Mechanisms of Microbial Disease																										
BIO 482 Recombinant DNA																										
BIO 482 L Recombinant DNA Laboratory																										
BIO 487 Bioinformatics																										
BIO 490 Seminar in Life Sciences																										
BIO 492 Special Problems in Life Sciences																										

Legend: **I** Introduced **P** Practiced **R** Reinforced

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## BA/BS in Biology

Courses and Activities Mapped to BA/BS in Biology Outcome Set

### 1. Formatulate and Test Hypothesis

Formulate a testable hypothesis and design and perform a study to test it

#### 1.1. Formulate a testable hypothesis

#### 1.2. Design and perform a study to test hypothesis

### Courses and Learning Activities

**Legend:** I Introduced P Practiced R Reinforced

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