



BioComm Correlation to the Massachusetts Science Curriculum Framework, Grades 9-10

Strand 2 : Life Science (Biology)

Standards and Expected Performances	Location/Page where Standard is found
1. The Chemistry of Life	
1.1 Explain the significance of carbon in organic molecules.	28-29; 86-881 129-130; 225-227; 240; 263.
1.2 Recognize the six most common elements in organic molecules (C, H, N, O, P, S).	28-29; 86-881 129-130; 225-227; 240; 263.
1.3 Describe the composition and functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).	209; 225-227; 290; 225-337; 344-345.
1.4 Describe how dehydration synthesis and hydrolysis relate to organic molecules.	
1.5 Explain the role of enzymes in biochemical reactions.	262-267; 344; 351.
2. Structure and Function of Cells	
2.1 Relate cell parts/organelles to their functions.	207-211; 297; 374; 432.
2.2 Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity.	208-210.

2.3 Distinguish between plant and animal cells.	120-121; 206-211; 214-218; 441.
2.4 Describe how cells function in a narrow range of physical conditions, such as temperature and pH, to perform life functions that help to maintain homeostasis.	49-53; 198-201; 217-218; 260-264.
2.5 Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).	207-213.
2.6 Identify the reactants and products in the general reaction of photosynthesis. Describe the use of isotopes in this identification.	38-41; 85-88.
2.7 Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things.	38-49; 81; 85-88; 99-103; 107.
2.8 Identify how cellular respiration is important for the production of ATP.	39.
2.9 Explain the interrelated nature of photosynthesis and cellular respiration.	38-40.
2.10 Describe and compare the processes of mitosis and meiosis, and their role in the cell cycle.	292-304.
3. Genetics	
3.1 Describe the structure and function of DNA, and distinguish among replication, transcription, and translation.	290; 329-337; 347-349.
3.2 Describe the processes of replication, transcription, and translation and how they relate to each other in molecular biology.	285-291; 299-303; 307; 310-316; 329-338; 344-346.
3.3 Describe the general pathway by which ribosomes synthesize proteins by using tRNAs to translate genetic information encoded in mRNAs.	285-291; 299-303; 307; 310-316; 329-338; 344-346.
3.4 Explain how mutations in the DNA sequence of a gene may be silent or result in phenotypic change in an organism and in its offspring.	299-303; 290-292; 312-316; 339; 316-323; 669-671; 678-681.
3.5 Differentiate between dominant, recessive, codominant, polygenic, and sex-linked traits.	310-312; 318-322; 338; 344-346; 354.

3.6 State Mendel's laws of segregation and independent assortment.	216-318.
3.7 Use a Punnett Square to determine the genotype and phenotype of monohybrid crosses.	312-314; 318-320; 326.
3.8 Explain how zygotes are produced in the fertilization process.	304-309.
3.9 Recognize that while viruses lack cellular structure, they have the genetic material to invade living cells.	210-211; 243; 486.
4. Human Anatomy and Physiology	
4.1 Explain how major organ systems in humans (e.g., kidney, muscle, lung) have functional units (e.g., nephron, sarcome, alveoli) with specific anatomy that perform the function of that organ system.	218-221; 224-248.
4.2 Describe how the function of individual systems within humans are integrated to maintain a homeostatic balance in the body.	198-206; 211-214; 218.
5. Evolution and Biodiversity	
5.1 Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution.	430-434; 456-457.
5.2 Illustrate how genetic variation is preserved or eliminated from a population through Darwinian natural selection (evolution) resulting in biodiversity.	428-430; 452-461.
5.3 Describe how the taxonomic system classifies living things into domains (eubacteria, archaebacteria, and eukaryotes) and kingdoms (animals, plants, fungi, etc.).	436-451.
6. Ecology	
6.1 Explain how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, and nitrogen).	7-23; 26-30; 91-93.

6.2 Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels.	14-16; 38-43; 54-61; 99-104.
6.3 Identify the factors in an ecosystem that influence fluctuations in population size.	143-178; 182-189; 612-625; 702-723.
6.4 Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduction of non-native species.	99-103; 105-111; 126-128; 452; 472-478; 566-570; 587-591; 602-610; 330-639; 730-752.
6.5 Explain how symbiotic behavior produces interactions within ecosystems.	721-639; 685-689; 710-713; 727-740; 744-747.