

**GLENCOE CORRELATION**  
**BSCS BIOLOGY: A MOLECULAR APPROACH** © 2001  
 MASSACHUSETTS  
 Science and Technology/Engineering Curriculum Framework

OBJECTIVES	PAGE REFERENCES
<b>Inquiry and Experimentation</b>	
<b>Scientific inquiry and experimentation should not be taught or tested as separate, stand-alone skills. Rather, opportunities for inquiry and experimentation should arise within a well-planned curriculum in the domains of science. They should be assessed through examples drawn from the life, physical, and earth and space science standards so that it is clear to students that in science, <i>what</i> is known does not stand separate from <i>how</i> it is known.</b>	
<i>High School</i>	
• Pose questions and state hypotheses based on prior scientific observations, experiments, and knowledge.	SE: 14-15 <i>Investigation</i> 696-698, 716-718, 720-723, 726-729, 739-741, 782-783 ATE: 14
• Distinguish between hypothesis and theory as scientific terms.	SE: 7, 8, 13, 14-15 <i>Theory</i> 13 ATE: 8
• Either individually or as part of a student team, design and complete a scientific experiment that extends over several days or weeks.	SE: <i>Investigation</i> 700-702, 718-719, 739-741, 749-751, 782-783
• Use mathematics to analyze and support findings and to model conclusions.	SE: <i>Investigation</i> 700-702, 702-704, 712-713, 748-749, 756-758, 758-760, 768-770, 787-788 <i>Appendix 13A</i> 802-803
• Simulate physical processes or phenomena using different kinds of representations.	SE: <i>Investigation</i> 709-712, 732-733, 733-736, 741-742, 768-770, 770-774
• Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.	SE: 16-17 <i>Investigation</i> 698-700, 702-704, 714-716, 780-781 ATE: 16
• Revise scientific models.	SE: 7-12, 14-15 <i>Theory</i> 114, 514, 676 <i>Investigation</i> 760-762
• Communicate and defend a scientific argument.	SE: 686-687 <i>Investigation</i> 758-760, 768-770, 770-774, 782-783, 791-792
<b>Biology Learning Standards for a Full First-Year Course in Grade 9 or 10</b>	
<b>1. The Chemistry of Life</b>	
<i>Broad Concept:</i> Living things are made of atoms bonded together to form organic molecules.	
<b>1.1 Explain the significance of carbon in organic molecules.</b>	SE: 33-34 ATE: 34
<b>1.2 Recognize the six most common elements in organic molecules (C, H, N, O, P, S).</b>	SE: 25

**Boldface type** indicates core standards for full-year courses.  
 An asterisk (\*) indicates core standards for integrated courses.

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<b>1.3 Describe the composition and functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).*</b>	SE: 34-42 <i>Investigation</i> 698-700 ATE: 37, 38
1.4 Describe how dehydration synthesis and hydrolysis relate to organic molecules.	SE: 62-63, 142, 145-146
<b>1.5 Explain the role of enzymes in biochemical reactions.</b>	SE: 38, 61-62 <i>Investigation</i> 704-706, 707-709 ATE: 61
<b>2. Structure and Function of Cells</b> <i>Broad Concept:</i> All living things are composed of cells. Life processes in a cell are based on molecular interactions.	
<b>2.1 Relate cell parts/organelles to their functions.*</b>	SE: 104, 137, 163-172 <i>Focus On</i> 172 <i>Investigation</i> 723-725
<b>2.2 Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity.*</b>	SE: 160-172 <i>Investigation</i> 723-725 ATE: 170
<b>2.3 Distinguish between plant and animal cells.*</b>	SE: 104, 163, 164-165, 169 <i>Investigation</i> 723-725
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.	SE: 32, 61, 93 <i>Investigation</i> 696-698, 704-707
<b>2.5 Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).*</b>	SE: 78-85, 163 <i>Investigation</i> 709-712, 712-713 ATE: 79, 80, 83, 84
<b>2.6 Identify the reactants and products in the general reaction of photosynthesis. Describe the use of isotopes in this identification.</b>	SE: 55, 102-106, 108-112, 115-117 <i>Focus On</i> 113 <i>Investigation</i> 714-716, 716-718 ATE: 106, 112
<b>2.7 Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things.*</b>	SE: 55, 56, 60, 121, 636-637 <i>Investigation</i> 789-791
<b>2.8 Identify how cellular respiration is important for the production of ATP.</b>	SE: 55, 130-141 <i>Investigation</i> 720-723 ATE: 132, 139
<b>2.9 Explain the interrelated nature of photosynthesis and cellular respiration.*</b>	SE: 55, 142 ATE: 142
<b>2.10 Describe and compare the processes of mitosis and meiosis, and their role in the cell cycle.*</b>	SE: 214-216, 222-224, 322-324 <i>Investigation</i> 731-732, 741-742 ATE: 222, 323
<b>3. Genetics</b> <i>Broad Concept:</i> Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism.	
<b>3.1 Describe the structure and function of DNA, and distinguish among replication, transcription, and translation.*</b>	SE: 41, 43-44, 216-219, 234, 240-253 <i>Investigation</i> 730-731, 732-733, 733-736 ATE: 234, 242

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3.2 Describe the processes of replication, transcription, and translation and how they relate to each other in molecular biology.	SE: 41, 43-44, 216-219, 234, 240-253, 392-395 <i>Focus On</i> 396 <i>Biological Challenges</i> 401 <i>Investigation</i> 730-731, 732-733, 733-736 ATE: 234, 242
3.3 Describe the general pathway by which ribosomes synthesize proteins by using tRNAs to translate genetic information encoded in mRNAs.	SE: 234-235, 247-253 <i>Investigation</i> 733-736 ATE: 235, 249
<b>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.</b>	SE: 221, 406-409, 425, 757 <i>Investigation</i> 756-758
<b>3.5 Differentiate between dominant, recessive, codominant, polygenic, and sex-linked traits.</b>	SE: 352-353, 358-365 ATE: 358
<b>3.6 State Mendel's laws of segregation and independent assortment.</b>	SE: 352-355 ATE: 355
<b>3.7 Use a Punnett Square to determine the genotype and phenotype of monohybrid crosses.*</b>	SE: 353, 354 <i>Investigation</i> 751-754 ATE: 354
<b>3.8 Explain how zygotes are produced in the fertilization process.</b>	SE: 262, 263, 292, 320, 324, 325
3.9 Recognize that while viruses lack cellular structure, they have the genetic material to invade living cells.	SE: 254-257, 453 <i>Focus On</i> 257
<b>4. Human Anatomy and Physiology</b> <i>Broad Concept:</i> There is a relationship between structure and function in organ systems of humans.	
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.	SE: 89-91, 94-97, 197-198, 557 <i>Investigation</i> 713-714
4.2 Describe how the function of individual systems within humans are integrated to maintain a homeostatic balance in the body.	SE: 94-97, 146, 209 <i>Focus On</i> 146 <i>Investigation</i> 713-714 ATE: 209
<b>5. Evolution and Biodiversity</b> <i>Broad Concept:</i> Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments.	
<b>5.1 Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution.</b>	SE: 500, 503-507 <i>Focus On</i> 500, 513 <i>Biological Challenges</i> 502 <i>Theory</i> 514 <i>Investigation</i> 767-768, 770-774 ATE: 504
<b>5.2 Illustrate how genetic variation is preserved or eliminated from a population through Darwinian natural selection (evolution) resulting in biodiversity.</b>	SE: 9-12, 423-425, 426-428, 505-506 <i>Theory</i> 13 <i>Focus On</i> 425 <i>Investigation</i> 760-762, 768-770 ATE: 12

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<b>5.3 Describe how the taxonomic system classifies living things into domains (eubacteria, archaeobacteria, and eukaryotes) and kingdoms (animals, plants, fungi, etc.).*</b>	SE: 468-472, 474-480 <i>Biological Challenges</i> 481 <i>A Brief Survey of Organisms</i> 483-497 <i>Investigation</i> 763-764, 764-767 ATE: 470
<b>6. Ecology</b> <i>Broad Concept:</i> Ecology is the interaction between living organisms and their environment.	
<b>6.1 Explain how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, and nitrogen).*</b>	SE: 56, 634-637, 640-642, 669 <i>Investigation</i> 791-792
<b>6.2 Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels.*</b>	SE: 56, 57, 60, 636-638 <i>Investigation</i> 791-792, 792-794, 794-497 ATE: 637
6.3 Identify the factors in an ecosystem that influence fluctuations in population size.	SE: 634-635, 638, 643, 645-347 <i>Investigation</i> 791-792, 792-794 ATE: 645, 646
6.4 Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduction of non-native species.	SE: 635, 663-68, 671-672, 674-675 <i>Biological Challenges</i> 673 ATE: 667
6.5 Explain how symbiotic behavior produces interactions within ecosystems.	SE: 456, 639-640 <i>Theory</i> 676 <i>Appendix 12A</i> 801-802