

GLENCOE CORRELATION
BIOLOGY: THE DYNAMICS OF LIFE
MASSACHUSETTS

Science and Technology/Engineering Curriculum Framework

OBJECTIVES	PAGE REFERENCES
Inquiry and Experimentation	
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.	
<i>High School</i>	
<ul style="list-style-type: none"> • Pose questions and state hypotheses based on prior scientific observations, experiments, and knowledge. 	SE: <i>Design Your Own BioLab</i> 58-59, 164-165, 238-239, 496-497, 734-735 <i>Internet BioLab</i> 544-545 TWE: AS 239
<ul style="list-style-type: none"> • Distinguish between hypothesis and theory as scientific terms. 	SE: 12, 18 <i>Focus On</i> 1060-1061 TWE: EX 18
<ul style="list-style-type: none"> • Either individually or as part of a student team, design and complete a scientific experiment that extends over several days or weeks. 	SE: <i>Design Your Own BioLab</i> 58-59, 330-331, 496-497, 756-757 <i>Internet BioLab</i> 274-275 TWE: PR 227, 257 CA 623
<ul style="list-style-type: none"> • Use mathematics to analyze and support findings and to model conclusions. 	SE: <i>Internet BioLab</i> 24-25, 626-627 <i>MiniLab</i> 102 <i>Investigate BioLab</i> 104-105, 386-387 <i>Problem-Solving Lab</i> 154, 262, 311 <i>Connection to Math</i> 276 TWE: AC 313
<ul style="list-style-type: none"> • Simulate physical processes or phenomena using different kinds of representations. 	SE: <i>Investigate BioLab</i> 84-85, 302-303, 354-355, 1016-1017 <i>Internet BioLab</i> 414-415 TWE: RE 208 QD 259 AL 266-267 IS 342
<ul style="list-style-type: none"> • Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions. 	SE: <i>Design Your Own BioLab</i> 58-59, 164-165, 522-523, 734-735 <i>Investigate BioLab</i> 84-85, 104-105 <i>Internet BioLab</i> 238-239, 274-275 TWE: BR 15
<ul style="list-style-type: none"> • Revise scientific models. 	SE: <i>Problem-Solving Lab</i> 447 TWE: UM 381 QD 381 CA 411, 452 PR 1061

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

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<ul style="list-style-type: none"> Communicate and defend a scientific argument. 	SE: <i>Writing About Biology</i> 190, 438 <i>Forming Your Opinion</i> 388, 1044-1045 TWE: AS 127, 165 AL 96-97 IN 123 PR 394
Biology Learning Standards for a Full First-Year Course in Grade 9 or 10	
1. The Chemistry of Life	
<i>Broad Concept:</i> Living things are made of atoms bonded together to form organic molecules.	
1.1 Explain the significance of carbon in organic molecules.	SE: 157-161, 163 <i>BioDigest</i> 245 TWE: QD 159
1.2 Recognize the six most common elements in organic molecules (C, H, N, O, P, S).	SE: 141-142, 158, 160, 163 <i>BioDigest</i> 245 TWE: CD 142
1.3 Describe the composition and functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).*	SE: 157-161, 163 <i>BioDigest</i> 245 TWE: IS 158 VL 161 DI 163
1.4 Describe how dehydration synthesis and hydrolysis relate to organic molecules.	SE: 158, 161, 234
1.5 Explain the role of enzymes in biochemical reactions.	SE: 161, 163 <i>Inside Story</i> 162 <i>Design Your Own BioLab</i> 164-165 <i>BioDigest</i> 245 TWE: AL 160
2. Structure and Function of Cells	
<i>Broad Concept:</i> All living things are composed of cells. Life processes in a cell are based on molecular interactions.	
2.1 Relate cell parts/organelles to their functions.*	SE: 180-185, 187 <i>Problem-Solving Lab</i> 180 <i>MiniLab</i> 182 <i>BioDigest</i> 246 TWE: DP 183 DI 247
2.2 Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity.*	SE: 173-174 <i>Investigate BioLab</i> 188-189 <i>BioDigest</i> 245
2.3 Distinguish between plant and animal cells.*	SE: 179-180, 184 <i>Inside Story</i> 186 <i>Investigate BioLab</i> 188-189 TWE: AL 182-183 DP 183 TS 186
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: 149-150, 161, 175, 195 <i>Design Your Own BioLab</i> 164-165

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2.5 Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).*	SE: 155, 175-178, 195-199 <i>Problem-Solving Lab</i> 176 <i>MiniLab</i> 198 <i>BioDigest</i> 247 TWE: AL 196-197 CA 199
2.6 Identify the reactants and products in the general reaction of photosynthesis. Describe the use of isotopes in this identification.	SE: 225-228, 230 <i>MiniLab</i> 228 <i>Inside Story</i> 229 TWE: CA 228 DI 230
2.7 Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things.*	SE: 9, 46, 50, 221, 225
2.8 Identify how cellular respiration is important for the production of ATP.	SE: 222-224, 231-232, 234 <i>Inside Story</i> 233 TWE: VL 233
2.9 Explain the interrelated nature of photosynthesis and cellular respiration.*	SE: 184-185, 225-228, 230, 231-232, 234, 237 <i>BioDigest</i> 247 TWE: RM 184
2.10 Describe and compare the processes of mitosis and meiosis, and their role in the cell cycle.*	SE: 203-204, 206-210, 263-270 <i>BioDigest</i> 247 TWE: EN 206 IS 265 VL 266 PO 270
3. Genetics <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.	
3.1 Describe the structure and function of DNA, and distinguish among replication, transcription, and translation.*	SE: 281-285, 290-291, 293-295 <i>Inside Story</i> 286-287 <i>BioDigest</i> 361-362 TWE: CE 284 QD 285 DI 287, 294
3.2 Describe the processes of replication, transcription, and translation and how they relate to each other in molecular biology.	SE: 284-285, 291-295 <i>Inside Story</i> 286-287 <i>MiniLab</i> 293 <i>Investigate BioLab</i> 302-303 <i>BioDigest</i> 361-362 TWE: DI 287, 294 AS 295
3.3 Describe the general pathway by which ribosomes synthesize proteins by using tRNAs to translate genetic information encoded in mRNAs.	SE: 289-290, 293-295 <i>MiniLab</i> 293 <i>BioDigest</i> 362 TWE: PO 294 VL 362

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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.	SE: 296-297, 406 <i>Problem-Solving Lab</i> 299 TWE: CDIV 407
3.5 Differentiate between dominant, recessive, codominant, polygenic, and sex-linked traits.	SE: 256-257, 311-314, 315-320, 323, 326-328 <i>Problem-Solving Lab</i> 311, 318, 326 <i>BioDigest</i> 360, 363 TWE: IS 313
3.6 State Mendel's laws of segregation and independent assortment.	SE: 256-257 <i>BioDigest</i> 360 TWE: CA 256, 361
3.7 Use a Punnett Square to determine the genotype and phenotype of monohybrid crosses.*	SE: 260-261 <i>Problem-Solving Lab</i> 311 TWE: CD 260 IS 261 QD 312, 317 IN 317
3.8 Explain how zygotes are produced in the fertilization process.	SE: 253-254, 265-266, 651, 676, 1005-1006 <i>Inside Story</i> 678 <i>MiniLab</i> 1006
3.9 Recognize that while viruses lack cellular structure, they have the genetic material to invade living cells.	SE: 475-483 <i>BioDigest</i> 550 <i>Focus On</i> 1074-1075 TWE: AC 481 TS 1074
4. Human Anatomy and Physiology <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: 901-902, 906-907, 972, 985-986 <i>MiniLab</i> 907 <i>Inside Story</i> 908 TWE: QD 985
4.2 Describe how the function of individual systems within humans are integrated to maintain a homeostatic balance in the body.	SE: 986, 929-935, 974, 984, 987, 1031-1033 TWE: IN 933
5. Evolution and Biodiversity <i>Broad Concept:</i> Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments.	
5.1 Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution.	SE: 393, 397-403 <i>BioDigest</i> 468 TWE: AC 400 IS 401 DP 401
5.2 Illustrate how genetic variation is preserved or eliminated from a population through Darwinian natural selection (evolution) resulting in biodiversity.	SE: 395-396, 404-409 <i>Internet BioLab</i> 414-415 <i>BioDigest</i> 468 TWE: AL 408-409 CA 468

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5.3 Describe how the taxonomic system classifies living things into domains (eubacteria, archaeobacteria, and eukaryotes) and kingdoms (animals, plants, fungi, etc.).*	SE: 447-449, 456-459 <i>BioDigest</i> 469 <i>Focus On</i> 1070-1071 TWE: DI 449 PR 457
6. Ecology <i>Broad Concept:</i> Ecology is the interaction between living organisms and their environment.	
6.1 Explain how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, and nitrogen).*	SE: 52-54, 56-57 <i>Inside Story</i> 55 TWE: QD 53 PR 55 RE 56 MA 57
6.2 Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels.*	SE: 50-52 <i>BioDigest</i> 133 TWE: CA 50, 53 RE 51 TTPK 51
6.3 Identify the factors in an ecosystem that influence fluctuations in population size.	SE: 92, 96-99 <i>BioDigest</i> 134, 135 TWE: IN 97, 98 TTPK 98
6.4 Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduction of non-native species.	SE: 67-69, 116-120 <i>Biology and Society</i> 60 <i>Internet BioLab</i> 127 <i>BioDigest</i> 135 TWE: EX 69 IN 116
6.5 Explain how symbiotic behavior produces interactions within ecosystems.	SE: 44-45 <i>BioDigest</i> 132-133 TWE: RE 44 RM 44 CA 44 CB 133

Codes Used for TWE Pages

AC	Activity	IN	Inquiry
AL	Additional Lab	IS	Inclusion Strategy
AS	Assessment	MA	Modified Assessment
BR	Brainstorming	PO	Portfolio
CA	Challenge Activity	PR	Project
CB	Content Background	QD	Quick Demo
CD	Concept Development	RE	Reinforcement
CDIV	Cultural Diversity	RM	Revealing Misconceptions
CE	Chalkboard Example	TS	Teaching Strategies
DI	Daily Intervention	TTPK	Tying to Prior Knowledge
DP	Display	UM	Using Models
EN	Enrichment	VL	Visual Learning
EX	Extension		