

Correlation of *Biology: The Dynamics of Life* to Mississippi Science Framework, Biology I Competencies and Objectives Grades 9-10 By Lesson

Section	Mississippi Competencies and Objectives
<i>Chapter 1 Biology: The Study of Life</i>	
1.1	2a
1.2	1b, 1c
1.3	1d
BioDigest 1	2a
<i>Chapter 2 Principles of Ecology</i>	
2.1	7b
2.2	1b, 1c; 7a, 7b, 7d
<i>Chapter 3 Communities and Biomes</i>	
3.1	7e
3.2	7c
<i>Chapter 4 Population Biology</i>	
4.1	7b
4.2	7b, 7e
<i>Chapter 5 Biological Diversity and Conservation</i>	
5.1	2d; 7e
5.2	7e
BioDigest 2	7a, 7b, 7d, 7e
<i>Chapter 6 The Chemistry of Life</i>	
6.1	2a, 2b, 2d
6.2	2c
6.3	1a, 1b, 1c; 2e, 2f
<i>Chapter 7 A View of the Cell</i>	
7.1	2a
7.2	2e
7.3	3b, 3c
<i>Chapter 8 Cellular Transport and the Cell Cycle</i>	
8.1	2c; 3e
8.2	3f
8.3	
<i>Chapter 9 Energy in a Cell</i>	
9.1	4a
9.2	4b
9.3	1d; 4b, 4c
BioDigest 3	2e; 4a
<i>Chapter 10 Mendel and Meiosis</i>	
10.1	5d; 5e
10.2	3g

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Section	Mississippi Competencies and Objectives
Chapter 11 DNA and Genes	
11.1	5a, 5d
11.2	5a
11.3	5a, 5b
Chapter 12 Patterns of Heredity and Human Genetics	
12.1	5e, 5f
12.2	5d, 5e
12.3	5e, 5f
Chapter 13 Genetic Technology	
13.1	5f
13.2	5c, 5f
13.3	5c
BioDigest 4	3f; 5a, 5e
Chapter 14 The History of Life	
14.1	6e
14.2	3a; 4b; 6f
Chapter 15 The Theory of Evolution	
15.1	6e
15.2	6f
Chapter 16 Primate Evolution	
16.1	6a, 6e, 6f
16.2	6a, 6e, 6f
Chapter 17 Organizing Life's Diversity	
17.1	6a, 6b
17.2	6a, 6b
BioDigest 5	6a, 6b, 6e
Chapter 18 Viruses and Bacteria	
18.1	6d
18.2	1c; 6d
Chapter 19 Protists	
19.1	6b
19.2	6b
19.3	1b, 1c
Chapter 20 Fungi	
20.1	6b
20.2	3h
BioDigest 6	6b, 6d

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Section	Mississippi Competencies and Objectives
<i>Chapter 21 What Is a Plant?</i>	
21.1	6b
21.2	6c
<i>Chapter 22 The Diversity of Plants</i>	
22.1	6c
22.2	6c
22.3	6c
<i>Chapter 23 Plant Structure and Function</i>	
23.1	3b
23.2	
23.3	1a; 3f
<i>Chapter 24 Reproduction in Plants</i>	
24.1	3f, 3h
24.2	7c
24.3	3f, 3h; 7c
BioDigest 7	6c; 7c
<i>Chapter 25 What Is an Animal?</i>	
25.1	6b
25.2	6c
<i>Chapter 26 Sponges, Cnidarians, Flatworms, and Roundworms</i>	
26.1	3d, 3h; 6b
26.2	3h; 6a
26.3	3h; 6a
26.4	6a
<i>Chapter 27 Mollusks and Segmented Worms</i>	
27.1	6b
27.2	1c
<i>Chapter 28 Arthropods</i>	
28.1	3h; 6a
28.2	
<i>Chapter 29 Echinoderms and Invertebrate Chordates</i>	
29.1	6a, 6e
29.2	6a, 6e
BioDigest 8	6c

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Section	Mississippi Competencies and Objectives
<i>Chapter 30 Fishes and Amphibians</i>	
30.1	6a, 6f; 7c
30.2	6a, 6e, 6f
<i>Chapter 31 Reptiles and Birds</i>	
31.1	6a; 7c
31.2	6c, 6e, 6f
<i>Chapter 32 Mammals</i>	
32.1	6a
32.2	6a, 6e, 6f
<i>Chapter 33 Animal Behavior</i>	
33.1	6f
33.2	6f
BioDigest 9	6c, 6f
<i>Chapter 34 Protection, Support, and Locomotion</i>	
34.1	
34.2	
34.3	
<i>Chapter 35 The Digestive and Endocrine Systems</i>	
35.1	
35.2	2e
35.3	
<i>Chapter 36 The Nervous System</i>	
36.1	
36.2	
36.3	
<i>Chapter 37 Respiration, Circulation, and Excretion</i>	
37.1	
37.2	
37.3	
<i>Chapter 38 Reproduction and Development</i>	
38.1	
38.2	
38.3	

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Section	Mississippi Competencies and Objectives
<i>Chapter 39 Immunity from Disease</i>	
39.1	
39.2	
BioDigest 10	

MISSISSIPPI SCIENCE FRAMEWORK

BIOLOGY I

CONTENT STRANDS: *Life Science (L), Earth and Space Science (E), Physical Science (P)*

COMPETENCIES AND SUGGESTED TEACHING OBJECTIVES:

1. Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation. (L, P, E)

- a. Demonstrate the proper use and care for scientific equipment used in biology.
- b. Observe and practice safe procedures in the classroom and laboratory.
- c. Apply the components of scientific processes and methods in the classroom and laboratory investigations.
- d. Communicate results of scientific investigations in oral, written, and graphic form.

2. Investigate the biochemical basis of life. (L, P)

- a. Identify the characteristics of living things.
- b. Describe and differentiate between covalent and ionic bonds using examples of each.
- c. Describe the unique bonding and characteristics of water that makes it an essential component of living systems.
- d. Classify solutions using the pH scale and relate the importance of pH to organism survival.
- e. Compare the structure, properties and functions of carbohydrates, lipids, proteins and nucleic acids in living organisms.
- f. Explain how enzymes work and identify factors that can affect enzyme action.

3. Investigate cell structures, functions, and methods of reproduction. (L)

- a. Differentiate between prokaryotic and eukaryotic cells.
- b. Distinguish between plant and animal (eukaryotic) cell structures.
- c. Identify and describe the structure and basic functions of the major eukaryotic organelles.
- d. Describe the way in which cells are organized in multicellular organisms.
- e. Relate cell membrane structure to its function in passive and active transport.
- f. Describe the main events in the cell cycle and cell mitosis including differences in plant and animal cell divisions.
- g. Relate the importance of meiosis to sexual reproduction and the maintenance of chromosome number.
- h. Identify and distinguish among forms of asexual and sexual reproduction.

4. Investigate the transfer of energy from the sun to living systems. (L, P)

- a. Describe the structure of ATP and its importance in life processes.
- b. Examine, compare, and contrast the basic processes of photosynthesis and cellular respiration.
- c. Compare and contrast aerobic and anaerobic respiration.

5. Investigate the principles, mechanisms, and methodology of classical and molecular genetics. (L, P)

- a. Compare and contrast the molecular structures of DNA and RNA as they relate to replication, transcription, and translation.
- b. Identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes.
- c. Analyze the applications of DNA technology (forensics, medicine, agriculture).
- d. Discuss the significant contributions of well-known scientists to the historical progression of classical and molecular genetics.
- e. Apply genetic principles to solve simple inheritance problems including monohybrid crosses, sex linkage, multiple alleles, incomplete dominance, and codominance.
- f. Examine inheritance patterns using current technology (gel electrophoresis, pedigrees, karyotypes).

COMPETENCIES AND SUGGESTED TEACHING OBJECTIVES:**6. Investigate concepts of natural selection as they relate to diversity of life. (L)**

- a. Analyze how organisms are classified into a hierarchy of groups and subgroups based on similarities and differences.
- b. Identify characteristics of kingdoms including monerans, protists, fungi, plants and animals.
- c. Differentiate among major divisions of the plant and animal kingdoms (vascular/non-vascular; vertebrate/invertebrate).
- d. Compare the structures and functions of viruses and bacteria relating their impact on other living organisms.
- e. Identify evidence of change in species using fossils, DNA sequences, anatomical and physiological similarities, and embryology.
- f. Analyze the results of natural selection in speciation, diversity, adaptation, behavior and extinction.

7. Investigate the interdependence and interactions that occur within an ecosystem. (L, P, E)

- a. Analyze the flow of energy and matter through various cycles including carbon, oxygen, nitrogen and water cycles.
- b. Interpret interactions among organisms in an ecosystem (producer/consumer/decomposer, predator/prey, symbiotic relationships and competitive relationships).
- c. Compare variations, tolerances, and adaptations of plants and animals in major biomes.
- d. Investigate and explain the transfer of energy in an ecosystem including food chains, food webs, and food pyramids.
- e. Examine long and short-term changes to the environment as a result of natural events and human actions.