Shamokin Area School District

Keystone Biology Curriculum Map

Credits	Prerequisite	Weight
1.0 (Full Year – 5 Periods per week)	**Successful completion of Biology I and II but not proficient on the Keystone Exam**	**1.0**

Skills: Observations, Inferences, Application, Problem Solving, Analysis, and Mathematics.

Purpose: This course will provide remediation to students who successfully completed Biology I and II but have not shown proficiency on the Keystone Biology Exam.

Description: Keystone Biology will review the main topics of Basic Biological Principles, The Chemical Basis for Life, Bioenergetics, Homeostasis and Transport, Cell Growth and Reproduction, Genetics, Evolution, and Ecology. *Students will take the Pennsylvania Biology Keystone exam in December and again in May if they have not shown proficiency on the winter exam.*

Requirements: Homework, class work, quizzes, tests, projects, class participation, and completion of a Project Based Assessment. The Project Based Assessment is a pathway to proficiency to meet district graduation requirements. The projects are tasks that contain related activities based on the Performance Level Descriptors and Eligible Content of the Keystone Exams.

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Skill Number	Skill	Assessment Anchor	Coach Lesson
Concept 1: Basic Biological Principles			
1.01	Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms	BIO.A.1.1	1, 3
1.02	Compare cellular structure and their functions in prokaryotic and eukaryotic cells	BIO.A.1.2	1
1.03	Describe and interpret relationships between structure and function at various levels of biological organization	BIO.A.1.2	1, 2
Concept 2: The Chemical Basis for Life			
2.01	Describe the unique properties of water and how these properties support life on Earth	BIO.A.2.1	7
2.02	Explain how carbon is uniquely suited to form biological macromolecules	BIO.A.2.2	4
2.03	Describe how biological macromolecules form from monomers	BIO.A.2.2	5
2.04	Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms	BIO.A.2.2	5
2.05	Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction	BIO.A.2.3	6
2.06	Explain how factors such as pH, temperature, and concentration levels can affect enzyme function	BIO.A.2.3	6
Concept 3: Bioenergetics			
3.01	Describe the fundamental roles of plastids and mitochondria in energy transformations	BIO.A.3.1	8
3.02	Compare the basic transformation of energy during photosynthesis and cellular respiration	BIO.A.3.2	8
3.03	Describe the role of ATP in biochemical reactions	BIO.A.3.2	8, 9

Skill Number	Skill	Assessment Anchor	Coach Lesson
Concept 4: Homeostasis and Transport			
4.01	Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell	BIO.A.4.1	9
4.02	Compare the mechanisms that transport materials across the plasma membrane	BIO.A.4.1	9
4.03	Describe how membrane-bound cellular organelles facilitate the transport of materials within a cell	BIO.A.4.1	1
4.04	Explain how organisms maintain homeostasis	BIO.A.4.2	3
Concept 5: Cell Growth and Reproduction			
5.01	Describe the events that occur during the cell cycle: interphase, nuclear division, cytokinesis	BIO.B.1.1	10
5.02	Compare the processes and outcomes or mitotic and meiotic nuclear divisions	BIO.B.1.1	10
5.03	Describe how the process of DNA replication results in the transmission and/or conservation of genetic information	BIO.B.1.2	11
5.04	Explain the functional relationships between DNA, genes, alleles, chromosomes, and their roles in inheritance	BIO.B.1.2	11, 13
Concept 6: Theory of Evolution			
6.01	Explain how natural selection can impact allele frequencies of a population	BIO.B.3.1	17
6.02	Describe the factors that can contribute to the development of new species	BIO.B.3.1	18
6.03	Explain how genetic mutations may result in genotypic and phenotypic variations within a population	BIO.B.3.1	15, 17
6.04	Interpret evidence supporting the theory of evolution	BIO.B.3.2	19
6.05	Distinguish between the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation	BIO.B.3.3	1, 6, 13, 19

Skill Number	Skill	Assessment Anchor	Coach Lesson
Concept 7: Genetics			
7.01	Describe and/or predict observed patterns of inheritance	BIO.B.2.1	13, 14
7.02	Describe processes that can alter composition or number of chromosomes	BIO.B.2.1	15
7.03	Describe how the processes of transcription and translation are similar in all organisms	BIO.B.2.2	12
7.04	Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production od specific types of proteins	BIO.B.2.2	12
7.05	Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype	BIO.B.2.3	15
7.06	Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture	BIO.B.2.4	16
Concept 8: Ecology			
8.01	Describe the levels of ecological organization	BIO.B.4.1	20
8.02	Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems	BIO.B.4.1	20
8.03	Describe how energy flows through an ecosystem	BIO.B.4.2	21
8.04	Describe biotic interactions in an ecosystem	BIO.B.4.2	23
8.05	Describe how matter recycles through an ecosystem	BIO.B.4.2	22
8.06	Describe how ecosystems change in response to natural and human disturbances	BIO.B.4.2	24
8.07	Describe the effects of limiting factors on population dynamics and potential species extinction	BIO.B.4.2	25

Concept Time Schedule

Concept	Week	Days on Topic
Basic Biological Principles	1-2	7
The Chemical Basis for Life	3-4	10
Bioenergetics	4-5	4
Homeostasis and Transport	5-6	7
Cell Growth and Reproduction	7-8	8
Genetics	9-10	12
Evolution	11-12	5
Ecology	12-13	7

Students will take the Keystone Biology Exam in December after the Biology Coach Book Concepts have been covered in full. After the Winter Testing Session, students will begin working on the Keystone Biology Project Based Assessment. This coursework will continue into the spring.