CURRICULUM MAP FOR BIOLOGY II Shamokin Area High School

| **UNIT** 4**: The Biosphere**  |
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| **Learning Objectives** |  | **Text** **Section** | **Eligible Content** | **Eligible Content Descriptors** | **Assessments** |
| **Chapter 3: The Biosphere**3.1.1 Describe the study of ecology3.1.2 List and describe the levels of ecological organization3.1.3 Describe how biotic and abiotic factors influence the environment3.2.1 Define *primary producers*3.2.2 Describe how consumers obtain energy and nutrients3.3.1 Describe how energy flows through ecosystems3.3.2 Identify the three types of ecological pyramids3.4.1 Describe how matter cycles among the living and non-living parts of an ecosystem3.4.2 Describe how water cycles through the biosphere3.4.3 Describe the main nutrient cycles3.4.4 Describe how nutrient availability affects the productivity of ecosystems**Chapter 4: Ecosystems and Communities**4.1.1 Differentiate between weather and climate4.1.2 Identify the factors that influence climate4.2.1 Define niche4.2.2 Describe the role competition plays in shaping communities4.2.3 Describe the role predation plays in shaping communities4.2.4 Describe the three types of symbiotic relationships in nature4.3.1 Describe how ecosystems recover from a disturbance4.3.2 Compare primary and secondary succession4.4.1 Describe and compare the characteristics of the major biomes4.5.1 Discuss the factors that affect aquatic ecosystems**Chapter 5: Populations**5.1.1 List the characteristics used to describe a population5.1.2 Identify factors that affect population growth5.1.3 Describe exponential growth5.2.1 Identify factors that determine carrying capacity5.2.2 Identify the limiting factors that depend on population density5.2.3 Identify the limiting factors that do not depend on population density**Chapter 6: Humans in the Biosphere**6.1.1 Describe human activities that can affect the biosphere6.1.2 Describe the relationship between resource use and sustainable development6.2.1 Describe how human activities affect soil and land6.2.2 Describe how human activities affect water resources6.2.3 Describe how human activities affect air resources6.3.1 Define biodiversity and explain its value6.3.2 Identify current threats to biodiversity6.3.3 Describe how biodiversity can be preserved |  | 3.13.23.33.44.14.24.34.44.55.15.26.16.26.3 | BIO.B.4.1.1BIO.B.4.1.2BIO.B.4.2.1BIO.B.4.2.2BIO.B.4.2.1BIO.B.4.2.4BIO.B.4.2.3BIO.B.4.2.4BIO.B.4.1.2BIO.B.4.2.4BIO.B.4.2.2BIO.B.4.2.4BIO.B.4.1.1BIO.B. 4.1.2BIO.B.4.2.5BIO.B.4.2.5BIO.B.4.2.4BIO.B.4.2.4BIO.B.4.2.4 | BIO.B.4.1.1: Describe the ecological levels of organization (i.e., organism, population, community, ecosystem, biome, biosphere).BIO.B.4.1.2: Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.BIO.B.4.2.1: Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).BIO.B.4.2.2: Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).BIO.B.4.2.3: Describe how matter recycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, nitrogen cycle).BIO.B.4.2.4: Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of non-native species, pollution, fires).BIO.B.4.2.5: Describe the effects of limiting factors on population dynamics and potential species extinctionBIO.B.4.1.1: Describe the ecological levels of organization (i.e., organism, population, community, ecosystem, biome, biosphere).BIO.B.4.1.2: Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.BIO.B.4.2.1: Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).BIO.B.4.2.2: Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).BIO.B.4.2.3: Describe how matter recycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, nitrogen cycle).BIO.B.4.2.4: Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of non-native species, pollution, fires).BIO.B.4.2.5: Describe the effects of limiting factors on population dynamics and potential species extinction | AssignmentsQuizzesLabsTestsAssignmentsQuizzesLabsTests |

| **UNIT** 5**: Inheritance, Heredity and Genetics**  |
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| **Learning Objectives** |  | **Text** **Section** | **Eligible Content** | **Eligible Content Descriptors** | **Assessments** |
| **Chapter 10: Cell Growth and Division**10.1.1 Explain the problems that growth causes for cells10.1.2 Compare sexual and asexual reproduction10.2.1 Describe the role of chromosomes in cell division10.2.2 Name the main events of the cell cycle10.2.3 Describe what happens during the four phases of mitosis10.2.4 Describe the process of cytokinesis**Chapter 11**11.1.1 Describe Mendel’s studies and conclusions about inheritance11.1.2 Explain the principle of segregation11.2.1Explain how geneticists use the principle of probability to make Punnett squares11.2.2 Explain the principle of independent assortment11.2.3 Explain how Mendel’s principles apply to all organisms11.3.1 Describe other patterns of inheritance (co-dominance, incomplete dominance, multiple alleles, polygenic and sex-linked inheritance)11.3.2 Explain the relationship between genes and the environment11.4.1 Contrast the number of chromosomes in body cells and in gametes11.4.2 Summarize the events of meiosis11.4.3 Contrast mitosis and meiosis11.4.4 Describe how alleles from different genes can be inherited together**Chapter 12**12.1.1 Identify the role of DNA in heredity 12.2.1 Identify the chemical components of DNA12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code12.2.3 Describe the steps leading to the development of the double-helix model of DNA12.3.1 Summarize the events of DNA replication**Chapter 13**13.1.1 Contrast RNA and DNA13.1.2 Explain the process of transcription13.2.1 Identify the genetic code and explain how it is read13.2.2 Summarize the process of translation13.2.3 Describe the central dogma of molecular biology13.3.1 Define mutations and describe the different types of mutations13.3.2 Describe the effects mutations can have on genes**Chapter 14**14.1.1 Identify the types of human chromosomes in a karyotype14.1.2 Describe the patterns of inheritance in human traits14.1.3 Explain how pedigrees are used to study human traits14.2.1 Explain how small changes in DNA cause genetic disorders14.2.2 Summarize the problems caused by non-disjunction14.3.1 Describe how DNA is analyzed through gel electrophoresis**Chapter 15**15.1.1 Explain the purpose of selective breeding15.1.2 Explain how people increase genetic variation15.2.1 Explain how scientist manipulate DNA15.2.2 Describe the importance of recombinant DNA15.2.3 Define transgenic and describe the usefulness of some transgenic organisms to humans15.3.1 Describe the benefits of genetic engineering as they relate to agriculture and industry15.3.2 Explain how recombinant DNA technology can improve human health15.3.3 Summarize the process of DNA fingerprinting and explain its uses15.4.1 Describe some of the issues that relate to biotechnology15.4.2 Identify some of the pros and cons of genetically modified foods15.4.3 Describe some of the ethical issues relating to biotechnology |  | 10.110.211.111.211.311.412.112.212.313.113.213.314.114.214.315.115.215.315.4 | BIO.B.1.1.1BIO.B.1.1.1BIO.B.1.2.1BIO.B.1.2.2BIO.B.1.2.2BIO.B.2.1.1BIO.B.1.2.2BIO.B.2.1.1BIO.B.2.1.1BIO.B.1.1.1BIO.B.1.1.2BIO.B.1.2.2BIO.B.2.1.2BIO.B.1.2.2BIO.B.1.2.1BIO.B.1.2.1BIO.B.2.2.1BIO.B.2.2.1BIO.B.2.2.2BIO.B.2.1.2BIO.B.2.3.1BIO.B.3.1.3BIO.B.1.2.2BIO.B.2.1.1BIO.B.2.1.2BIO.B.3.1.3BIO.B.2.4.1BIO.B.1.2.2BIO.B.2.4.1BIO.B.1.2.1BIO.B.1.2.2BIO.B.2.4.1BIO.B.2.4.1BIO.B.2.4.1 | BIO.B.1.1.1: Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), and cytokinesisBIO.B.1.1.2: Compare and contrast the processes and outcomes of mitotic and meiotic nuclear divisionsBIO.B.1.2.1: Describe how the process of DNA replication results in the transmission and/or conservation of genetic informationBIO.B.1.2.2: Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritanceBIO.B.2.1.1: Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).BIO.B.2.1.2: Describe processes that can alter the composition of number of chromosomes (i.e., crossing-over, non-disjunction, duplication, translocation, deletion, insertion, inversion)BIO.B.1.2.1: Describe how the process of DNA replication results in the transmission and/or conservation of genetic informationBIO.B.1.2.2: Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritanceBIO.B.2.2.1: Describe how the process of transcription and translation are similar in all organisms.BIO.B.2.2.2: Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.BIO.B.2.3.1: Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frameshift).BIO.B.2.4.1: Explain how genetic engineering has impacted the fields of medicine, forensics and agriculture (e.g., selective breeding, gene splicing, cloning, GMOs, gene therapy).BIO.B.3.1.3: Explain how genetic mutations may result in genotypic and phenotypic variations within a population.BIO.B.1.2.1: Describe how the process of DNA replication results in the transmission and/or conservation of genetic informationBIO.B.1.2.2: Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritanceBIO.B.2.1.1: Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).BIO.B.2.1.2: Describe processes that can alter the composition of number of chromosomes (i.e., crossing-over, non-disjunction, duplication, translocation, deletion, insertion, inversion)BIO.B.2.4.1: Explain how genetic engineering has impacted the fields of medicine, forensics and agriculture (e.g., selective breeding, gene splicing, cloning, GMOs, gene therapy).BIO.B.3.1.3: Explain how genetic mutations may result in genotypic and phenotypic variations within a population. | AssignmentsQuizzesLabsTestsAssignmentsQuizzesLabsTestsAssignmentsQuizzesLabsTests |

| **UNIT** 6**: Evolution**  |
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| **Learning Objectives** |  | **Text** **Section** | **Eligible Content** | **Eligible Content Descriptors** | **Assessments** |
| **Chapter 16**16.1.1 State Charles Darwin’s contribution to science16.1.2 Describe the three patterns of biodiversity noted by Darwin16.2.1 Identify the conclusions drawn by Lyell and Hutton about Earth’s history16.2.2 Describe Lamarck’s hypothesis of evolution16.2.3 Describe Malthus’s view of population growth16.2.4 Explain the role of inherited variation in artificial selection16.3.1 Describe the conditions under which natural selection occurs16.3.2 Explain the principle of common descent16.4.1 Explain how geologic distribution of species relates to their evolutionary history16.4.2 Explain how fossils and the fossil record document the descent of modern species from ancient ancestors16.4.3 Describe what homologous structures and embryology suggest about the process of evolutionary change16.4.4 Explain how molecular evidence can be used to trace the process of evolution**Chapter 17**17.1.1 Define evolution in genetic terms17.1.2 Identify the main sources of genetic variation in a population17.1.3 State what determines the number of phenotypes for a trait17.2.1Explain how natural selection affects the frequency of traits17.2.2 Describe genetic drift17.2.3 Explain how different factors affect genetic equilibrium17.3.1 Identify the types of isolation that can lead to the formation of new species**Chapter 18**18.2.1 Explain the goal of evolutionary classification18.2.2 Describe how to make and interpret a cladogram18.2.3 Explain the use of DNA sequences in classification**Chapter 19**19.1.1 Explain what information fossils can reveal about ancient life19.1.2 Differentiate between relative dating and radiometric dating19.1.3 Identify the division of the geologic time scale19.1.4 Describe how environmental processes and living things have shaped life on Earth19.2.1 Identify the processes that influence the survival or extinction of a species or clade19.2.2 Contrast gradualism and punctuated equilibrium19.2.3 Describe two important patterns in macroevolution19.2.4 Explain the evolutionary characteristics of co-evolving organisms19.3.1 Identify some of the hypotheses about early Earth and the origin of life19.3.2 Explain the endosymbiotic theory19.3.3 Explain the significance of sexual reproduction in evolution |  | 16.116.216.316.417.117.217.318.219.119.219.3 | BIO.B.3.3.1BIO.B.1.2.2BIO.B.3.2.1BIO.B.3.3.1BIO.B.1.2.2BIO.B.3.2.1BIO.B.3.2.1BIO.B.1.2.2BIO.B.2.1.2BIO.B.3.1.1BIO.B.3.1.3BIO.B.3.2.1BIO.B.1.2.2BIO.B.2.1.1BIO.B.3.1.1BIO.B.3.1.2BIO.B.3.2.1BIO.B.3.2.1BIO.B.3.2.1BIO.B.3.2.1 | BIO.B.1.2.2: Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritanceBIO.B.2.1.1: Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).BIO.B.2.1.2: Describe processes that can alter the composition of number of chromosomes (i.e., crossing-over, non-disjunction, duplication, translocation, deletion, insertion, inversion)BIO.B.3.1.1: Explain how natural selection can impact allele frequencies of a populationBIO.B.3.1.2: Describe the factors that can contribute to the development of new species (e.g., isolating mechanisms, genetic drift, founder effect and migration)BIO.B.3.1.3: Explain how genetic mutations may result in genotypic and phenotypic variations within a population.BIO.B.3.2.1 Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical and universal genetic codeBIO.B.3.3.1 Distinguish among the scientific terms: hypothesis, inference, law, theory, principle, fact, observationBIO.A.1.2.2: Describe and interpret relationships between structure and function at various levels of biological organizationBIO.B.3.2.1 Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical and universal genetic code).BIO.B.3.3.1 Distinguish among the scientific terms: hypothesis, inference, law, theory, principle, fact and observation | AssignmentsQuizzesLabsTestsAssignmentsQuizzesLabsTests |