Moon Area School District Curriculum Map

Course: Honors Biology
Grade Level: 9 & 10
Content Area: Science
Frequency: Full-Year Course

Big Ideas

1. Scientific Method/Lab Techniques
2. Lab Safety & Equipment
3. Characteristics of Life
4. Three Main Themes in Biology
5. Classification Systems in Biology
6. Kingdoms & Domains
7. Dichotomous Keys
8. General Chemistry
9. Properties of Water & Solutions
10. Carbon
11. Organic vs Inorganic Compounds
12. Biological Molecules (Carbohydrates, Lipids, Proteins, & Nucleic Acids)
13. Enzymes
14. Cell Organelles
15. Types of Cells
16. Levels of Organization
17. Cell Membrane Structure
18. Types of Active and Passive Transport
19. Osmosis (Hypertonic, Hypotonic, & Isotonic Solutions)
20. Microscopes
21. ATP & Chemical Energy
22. Photosynthesis
23. Light Dependent and Light Independent Reactions
24. Cellular Respiration
25. Glycolysis, Fermentation, Krebs Cycle & Electron Transport Chain
26. Surface Area to Volume Ratio
27. Chromosomes
28. Cell Cycle
29. Mitosis & Its Stages (PMAT)
30. Cytokinesis
31. Cancer
32. Meiosis & Its Stages (PMAT I & II)
33. Gamete Formation
34. Asexual vs Sexual Reproduction
35. DNA Structure

36. DNA Replication
37. RNA Structure
38. Transcription
39. Translation
40. Genes and Chromosomes
41. Mendelian Genetics
42. Probability
43. Punnett Squares
44. Sex-linked Inheritance
45. Non-Mendelian Inheritance
46. Human Genetic Disorders
47. Mutations
48. Genetic Engineering
49. Cloning
50. DNA Fingerprinting
51. Stem Cells
52. Human Genome Project
53. Geologic Time Scale
54. Types of Fossils
55. Fossil Dating Techniques
56. Darwin's Experiences and Influences
57. Darwin's Ideas
58. Speciation
59. Artificial Selection
60. Natural Selection
61. Fitness
62. Adaptation
63. Diversity of Life
64. Evolution Evidence
65. Convergent vs Divergent Evolution
66. Ecology
67. Organism, Population, Community, Ecosystem, & Biosphere
68. Energy Flow
69. Nutrient Cycles (Biogeochemical Cycles)
70. Food Chains, Food Webs, & Pyramids
71. Population Growth
72. Density-Dependent Limiting Factors vs Density-Independent Limiting Factors
73. Exponential Growth
74. Growth Within Limits
75. Human Population Growth
76. Community Interactions
77. Competition for Resources
78. Ecological Succession

79. Humans and the Environment
80. Global Warming
81. Conservation and Recycling
82. Terrestrial & Aquatic Biomes
83. Environmental Pollution
84. Bacteria Structure
85. Binary Fission & Conjugation
86. Virus Structure
87. Lytic & Lysogenic Cycles of Infection
88. Human Interaction
89. Animal Characteristics
90. Vertebrate vs Invertebrate
91. Radial vs Bilateral Symmetry
92. Body Plan
93. Phylum Porifera
94. Filter Feeding
95. Phylum Cnidaria
96. Sting & Stuff
97. Phylum Platyhelminthes
98. Flatworm Anatomy & Life Cycles
99. Phylum Nematoda
100. Roundworm Anatomy & Life Cycles
101. Free-living vs Parasitic
102. Human Interactions with Flatworms & Roundworms
103. Phylum Mollusca
104. Mollusk Diversity
105. Mollusk Body Plans
106. Human Interactions with Mollusks
107. Phylum Annelida
108. Annelid Characteristics
109. Phylum Echinodermata
110. Echinoderm Characteristics & Life Cycles
111. Phylum Arthropoda
112. Arthropod Characteristics & Life Cycles
113. Incomplete vs Complete Metamorphosis
114. Arthropod Diversity
115. Fish Characteristics & Organ Systems
116. Diversity of Fish
117. Amphibian Characteristics & Organ Systems
118. Diversity of Amphibians
119. Reptile Characteristics & Organ Systems
120. Diversity of Reptiles
121. Mammal Characteristics & Organ Systems

122. Diversity of Mammals

Essential Questions

1. What is biology?
2. How do we study biology?
3. What are the characteristics of life that are used to define living organisms?
4. What are the three main themes of biology?
5. Why are classification systems helpful in biology?
6. What are the six kingdoms and three domains in biology?
7. How is a dichotomous key used by taxonomists?
8. What aspects of Chemistry relate to life?
9. What is unique about the chemistry of water that makes it important for life?
10. What makes carbon a unique element for life?
11. What are the four major classes of macromolecules and what are their roles in living organisms?
12. How do enzymes function in living organisms?
13. How does the cell theory relate to life?
14. What roles do the various cell organelles play?
15. What are some similarities and differences for prokaryotic and eukaryotic cells?
16. What are some similarities and differences for plant and animal cells?
17. Describe the structure and function of the cell membrane.
18. How do materials move into and out of the cell?
19. What tools do biologists use to study cells?
20. What type of energy is used in cells, and what is the ultimate source of this energy?
21. Why is energy important for living organisms?
22. How is energy stored and released from ATP?
23. How do plants make sugars and store unused energy?
24. What are the energy conversions in photosynthesis?
25. What happens during the light dependent and light independent stages of photosynthesis?
26. How is ATP produced in respiration and fermentation?
27. Why do cells divide?
28. What are the phases of the eukaryotic cell cycle?
29. What are the four stages of mitosis?
30. How does cell division compare and contrast for eukaryotic and prokaryotic cells?
31. What is cytokinesis?
32. How does cancer relate to the cell cycle?
33. What are the stages of meiosis?
34. What happens during the production of gametes?
35. Why is meiosis necessary for sexually reproducing organisms?
36. What are genes?
37. Describe the structure of DNA?

38. What is DNA replication and how does it occur?
39. What is RNA and how does it compare/contrast to DNA?
40. What is protein synthesis?
41. How do transcription and translation take place?
42. What role do genes play in inheritance?
43. How are the terms dominance, segregation, and independent assortment related to heredity?
44. How does the human genetic system work?
45. How is sex determined in humans?
46. Explain the causes and symptoms of human genetic disorders.
47. How are pedigree charts and karyotypes used to diagnose genetic disorders?
48. How is a punnett square used to predict results of monohybrid and dihybrid crosses?
49. What is the difference between classic Mendelian genetics and non-Mendelian genetics?
50. How is a DNA fingerprint made and used for identification?
51. What is the human genome project?
52. How are clones made?
53. How does genetic engineering affect our lives?
54. How do scientists learn about past life forms?
55. How did Charles Darwin's experiences and observations lead to the theory of natural selection being the mechanism for evolution?
56. How can species change over time?
57. Why is diversity important for the survival of species?
58. What role do mutations and gene shuffling play in evolution?
59. What is ecology?
60. What is an ecosystem?
61. How does energy flow through an ecosystem?
62. How are nutrients recycled among organisms and ecosystems in the biosphere?
63. What are the feeding relationships of a food chain and food web?
64. What are the affects of human activities on the biogeochemical cycles?
65. What is a population and why are they important to study?
66. How does population size change?
67. What factors influence population growth?
68. Explain the past and projected changes in the world human population growth.
69. What are the three main types of interactions in an ecosystem.
70. How are humans and the environment connected?
71. How does ecological succession eventually culminate in a stable climax community?
72. What are the major biomes and their characteristics?
73. Identify the sources and effects of several major forms of environmental

pollution.

74. What are the structural features of prokaryotes?
75. Describe bacterial reproduction and growth.
76. What are the various roles of bacteria in the natural world and their uses for humans?
77. Why are viruses not considered living organisms?
78. What is the basic structure of a virus?
79. How do viruses affect cells?
80. What characteristics do all animals share?
81. What is the difference between a vertebrate and invertebrate?
82. What are the key characteristics of a sponge?
83. How does the process of filter feeding occur in a sponge?
84. What are the key characteristics of a cnidarian?
85. How do cnidarians feed?
86. What are some examples of cnidarians?
87. How are flatworms and roundworms different from earthworms?
88. What are the key characteristics of platyhelminthes and nematodes?
89. Compare free-living and parasitic flatworms.
90. Explain the lifecycle of a tapeworm.
91. Explain the relationship between humans and parasitic roundworms.
92. What are the key characteristics of mollusks?
93. How are gastropods, bivalves, and cephalopods different?
94. How do mollusks impact humans?
95. What are the key characteristics of annelids?
96. What are the key characteristics of echinoderms?
97. What are the key characteristics of arthropods?
98. What are the four main types of arthropods and give two examples of each?
99. How are complete and incomplete metamorphosis different?
100. What are some of the beneficial and harmful effects of insects on humans?
101. What are the key characteristics of fish?
102. What are the key characteristics of amphibians?
103. How are amphibians adapted for life on land?
104. What are the key characteristics of reptiles?
105. How are cold-blooded animals different from warm-blooded animals?
106. What are the key characteristics of birds?
107. How are birds adapted for flight?
108. What are the key characteristics of mammals?
109. How are monotremes, marsupials, and placental mammals different?

Primary Resource(s) & Technology:

Textbook, Lab Materials, Teacher Generated Notes/PPTs,
Microsoft Teams, Promethean Boards, Student Laptops/iPads

Pennsylvania and/or focus standards referenced at:
www.pdesas.org
www.education.pa.gov

Big Ideas/ EQs	Focus Standard(s)	Assessed Competencies (Key content and skills)	Timeline
1-7 1-7	State: PA Core Standards (2014) CC.3.5.9-10.A,B,D,E,F,G,H,J CC.3.6.9-10.H State: PA State Standards (2002) 3.1.10.C,E 3.2.10.B 3.3.10.A 3.8.10.A	• Section 1-1: The World of Biology • 1. Relate the relevance of biology to a person's everyday life. • 2. Describe the importance of biology in human society. • 3. List the characteristics of living things. • 4. Summarize the hierarchy of organization within complex multi-cellular organisms. • 5. Distinguish between homeostasis and metabolism and between, development, and • reproduction. • • Section 1-2: Themes in Biology • 1. Identify three important themes that help explain the living world. • 2. Explain how life can be diverse, yet unified. • 3. Describe how living organisms are interdependent. • • Chapter 17: Classification of Organisms • SWBAT: • Section 17-1: Biodiversity • 1. Relate biodiversity to biological classification. • 2. Identify the main criteria that Linnaeus used to classify organisms. • 3. List the common levels of classification from general to specific. • • Section 17-2: Systematics • 1. Identify criteria modern biologists used to classify organisms. • 2. Explain the information a phylogenic diagram displays. • 3. State the criteria used in cladistic analysis.	August - September

		• 4. Describe how a cladogram is made. • • Section 17-3: Modern Classification • 1. Describe the evidence that prompted the invention of the three-domain system of • classification. • 2. List the characteristics that distinguish between the domains bacteria, archae, and • eukarya. • 3. Describe the six-kingdom system of classification. • 4. Explain why taxonomic systems continue to change.	
8-13 8-12	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C, D,E,G,H,J CC.3.6.9-10.H State: PA State Standards (2002) 3.1.10.B,D,E 3.2.10.A 3.3.10.A,B 3.8.10.A	• Section 2-3: Water and Solutions • 1. Describe the structure of a water molecule. • 2. Explain how water's polar nature affects its ability to dissolve substances. • 3. Identify the roles of solutes and solvents. • 4. Differentiate between acids and bases. • • Section 3-1: Carbon Compounds • 1. Distinguish between organic and inorganic compounds. • 2. Explain the importance of carbon bonding in biological molecules. • 3. Identify functional groups in biological molecules. • 4. Summarize how large carbon molecules are synthesized and broken down. • • Section 3-2: Molecules of Life • 1. Distinguish between monosaccharides, disaccharides, and polysaccharides. • 2. Explain the relationship between amino acids and proteins. • 3. Describe how the lock and key model of enzyme function works. • 4. Compare the structure and function of each of the different types of lipids.	September - October
14-20 13-19	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C, D,E,G,H,J CC.3.6.9-10.A,B,D	• Section 1-4: Tools and Techniques • 1. List the functions of each of the major parts of a compound light microscope. • 2. Discuss the strengths and weaknesses of different types of microscopes.	October - November

	State: PA State Standards (2002) 3.1.10.B,D 3.2.10.A 3.3.10.A,B	• 3. Observe how the compound light microscope changes and image. • • Section 4-1: The History of Cell Biology • 1. Summarize the research that lead to the development of the cell theory. • 2. State the three principles of the cell theory. • 3. Explain why the cell is considered to be the basic unit of life. • • Section 4-2: Introduction to Cells • 1. Identify the limiting factor for cell size. • 2. Describe the three basic parts of a cell. • 3. Compare prokaryotic and eukaryotic cells. • • Section 4-3: Cell Organelles and Features • 1. Describe the structure and function of a cell's plasma membrane. • 2. Describe the roles of the major organelles found in cells. • 3. Describe the structure and function of the cytoskeleton. • • Section 4-4: Unique Features of Plant Cells • 1. Compare and contrast plant and animal cells. • 2. Compare plasma membrane, primary cell wall, and secondary cell wall. • • Chapter 5: Homeostasis and Cell Transport • SWBAT: • Section 4-1: Passive Transport • 1. Distinguish between diffusion and osmosis. • 2. Explain how substances cross the cell membrane. • 3. Explain how ion channels assist the diffusion of ions across the cell membrane. • • Section 5-2: Active Transport • 1. Distinguish between active and passive transport. • 2. Explain how the sodium-potassium pump operates. • 3. Compare endocytosis and exocytosis.	

21-25 20-26	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C,D,E,F,G,I,J CC.3.6.9-10.A,B,C,D,H State: PA State Standards (2002) 3.1.10.B,C 3.2.10.A,B 3.3.10.A,B	• Section 6-1: The Light Reactions • 1. Explain why almost all organisms depend on photosynthesis. • 2. Describe the role of chlorophyll and other pigments in photosynthesis. • 3. Summarize the main events of the light reactions. • 4. Explain how ATP is made during the light reactions. • • Section 6-2: The Calvin Cycle • 1. Summarize the main events of the Calvin Cycle. • 2. Distinguish between C3, C4, and CAM plants. • 3. Summarize how the light reactions and the Calvin Cycle work together to create the • continuous cycle of photosynthesis. • 4. Explain how environmental factors affect photosynthesis. • • Chapter 7: Cellular Respiration • SWBAT: • Section 7-1: Glycolysis and Fermentation • 1. Identify the two major steps of cellular respiration. • 2. Describe the major events in glycolysis. • 3. Compare lactic acid fermentation with alcoholic fermentation. • 4. Calculate the efficiency of glycolysis. • • Section 7-2: Aerobic Respiration • 1. Relate aerobic respiration to the structure of mitochondria • 2. Summarize the events of the Krebs Cycle. • 3. Summarize the events of the electron transport chain and chemiosmosis. • 4. Calculate the efficiency of aerobic respiration. • 5. Contrast the roles of glycolysis and aerobic respiration in cellular respiration.	November - December
26-34 27-35	State: PA Core Standards (2014)	• Section 8-1: Chromosomes • 1. Describe the structure of a chromosome.	December

	CC.3.5.9-10.B,D,E,F,G,I,J CC.3.6.9-10.C,E,F,H State: PA State Standards (2002) 3.1.10.B,C,E 3.2.10.B 3.3.10.A,B,C	• 2. Identify the differences in structure between prokaryotic and eukaryotic • chromosomes. • 3. Explain the difference between sex chromosomes and autosomes. • 4. Distinguish between diploid and haploid. • • Section 8-2: Cell Division • 1. Summarize the process of mitosis. • 2. Describe the four phases of mitosis. • 3. Compare cytokinesis in plant and animal cells. • 4. Observe the various phases of mitosis. • 5. Explain how cell division is controlled. • • Section 8-3: Meiosis • 1. Compare the end products of meiosis with those of mitosis. • 2. Summarize the events of meiosis I. • 3. Explain crossing over and how it contributes to the production of unique individuals. • 4. Summarize the events of meiosis II. • 5. Compare spermatogenesis and oogenesis. • 6. Define sexual reproduction.	
35-52 36-53	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C,D,E,F,G,H,I,J CC.3.6.9-10.A,C,E,F,G,H State: PA State Standards (2002) 3.1.10.A,B,C,D,E 3.2.10.A,B,C,D 3.3.10.A,B,C	• Section 10-1: Discovery of DNA • 1. Explain how scientists discovered the role of DNA. • 2. Describe the experiments of: Griffith, Avery, and Hershey/Chase. • • Section 10-2: DNA Structure • 1. Evaluate the contributions of Franklin and Wilkins in helping Watson and Crick • discover DNA's double helix structure. • 2. Describe the three parts of a nucleotide. • 3. Relate the role of the base-pairing rules to the structure of DNA. • • Section 10-3: DNA Replication • 1. Summarize the process of DNA replication. • 2. Identify the role of enzymes in the replication of DNA.	January - February

		• 3. Describe how complimentary base pairing guides DNA replication. • • Section 10-4: Protein Synthesis • 1. Outline the flow of genetic information from DNA to protein. • 2. Compare the structure of DNA to that of RNA. • 3. Summarize the process of transcription. • 4. Describe the importance of the genetic code. • 5. Compare the role of mRNA, rRNA, and tRNA in translation. • • Chapter 9: Fundamentals of Genetics • SWBAT: • Section 9-1: Mendel's Legacy • 1. Describe Mendel's contributions to understanding the basics of genetics. • 2. State two laws of heredity that were developed by Mendel's work. • 3. Distinguish between dominant and recessive traits. • 4. Describe how Mendel's results can be explained by scientific knowledge of genes • and chromosomes. • • Section 9-2: Genetic Crosses • 1. Differentiate between genotype and phenotype. • 2. Explain how probability is used to predict the results of genetic crosses. • 3. Use a Punnett square to predict the results of monohybrid and dihybrid genetic • crosses. • 4. Explain how a testcross is used to show the genotype of an individual whose • phenotype expresses the dominant trait. • 5. Differentiate a monohybrid cross from a dihybrid cross. • • Chapter 12: Inheritance Patterns and Human Genetics • SWBAT:	

		• Section 12-1: Chromosomes and Inheritance • 1. Distinguish between sex chromosomes and autosomes. • 2. Explain the roles of sex chromosomes and sex determination. • 3. Describe how a sex-linked gene affects the inheritance of traits. • 4. Explain the effect of crossing-over on the inheritance of genes in linkage groups. • 5. Distinguish between chromosome mutations and gene mutations. • • Section 12-2: Human Genetics • 1. Analyze pedigrees to determine how genetic traits and genetic disorders are • inherited. • 2. Summarize the different patterns of inheritance seen in genetic traits and • genetic disorders. • 3. Explain the inheritance of ABO blood groups. • 4. Explain how geneticists can detect and treat genetic disorders. • • Chapter 13: Gene Technology • SWBAT: • Section 13-1: DNA Technology • 1. Explain the significance of non-coding DNA to DNA identification. • 2. Describe four major steps commonly used in DNA identification. • 3. Explain the use of restriction enzymes, cloning vectors, and probes in making • recombinant DNA. • 4. Summarize several applications of DNA identification. • • Section 13-2: The Human Genome Project • 1. Discuss two major goals of the human genome project. • 2. State how information from the Human Genome Project will be applied to • future projects.	

		• • Section 13-3: Genetic Engineering • 1. Discuss the uses of genetic engineering in medicine. • 2. Summarize how gene therapy is being used to try to cure genetic disorders. • 3. Discuss cloning and its technology. • 4. Describe two ways genetic engineering has been used to improve crop yields. • 5. Discuss environmental and ethical issues associated with genetic engineering.	
53-65 54-58	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C,D,E,F,G,H,I,J CC.3.6.9-10.A,B,C State: PA State Standards (2002) 3.1.10.C,D,E 3.2.10.A,C 3.3.10.A,B,C,D	• Section 15-1: History of Evolutionary Thoughts • 1. Define the biological process of evolution. • 2. Summarize the history of scientific ideas about evolution. • 3. Describe Charles Darwin's contributions to scientific thinking about evolution. • 4. Analyze the reasoning in Darwin's theory of evolution by natural selection. • 5. Relate the concepts of adaptation and fitness to the theory of natural selection. • • Section 15-2: Evidence of Evolution • 1. Relate several inferences about the history of life that are supported by evidence • from fossils and rocks. • 2. Explain how the anatomy and development of organisms provide evidence of • shared ancestry. • 3. Compare the use of biological molecules with other types of analysis of • evolutionary relationships. • • Section 15-3: Evolution in Action • 1. Describe how convergent evolution can result among different species. • 2. Explain how divergent evolution can lead to species diversity. • 3. Compare artificial selection and natural selection.	March - April

		• 4. Explain how organisms can undergo coevolution. • • Chapter 16: Population Genetics and Speciation • SWBAT: • Section 16-1: Genetic Equilibrium • 1. Identify traits that vary in populations and that may be studied. • 2. Explain the importance of the bell curve to population genetics. • 3. Compare three causes of genotypic variation in a population. • 4. Calculate allele frequency and phenotype frequency. • 5. Explain Hardy-Weinberg genetic equilibrium. • • Section 16-2: Disruption of Genetic Equilibrium • 1. List five conditions under which evolution may take place. • 2. Explain how genetic drift can affect populations of different sizes. • 3. Contrast the effects of stabilizing selection, directional selection, and • disruptive selection. • 4. Identify examples of nonrandom mating. • • Section 16-3: Formation of Species • 1. Explain how the isolation of species can lead to speciation. • 2. Compare two kinds of isolation and the pattern of speciation associated • with each. • 3. Contrast the model of punctuated equilibrium with the model of gradual change.	
66-83 59-73	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C,D,E,F, G,H,I,J	• Section 18-1: Introduction to Ecology • 1. Define ecology. • 2. Describe an example showing the effects of interdependence upon organisms • in their environment.	April - May

	CC.3.6.9-10.A,B,C,G State: PA State Standards (2002) 3.1.10.A,B,C,E 3.2.10.C 3.3.10.A,B,D 4.1.10.A,C,D,E 4.2.10.A,B,C 4.3.10.A,B,C,D 4.6.10.A,B,C 4.7.10.A,B,C 4.8.10.A,B,C	• 3. State the five different levels at which ecology can be studied. • • Section 18-2: Ecology of Organisms • 1. Compare abiotic factors with biotic factors, and list two example of each. • 2. Describe two mechanisms that allow organisms to survive in a changing • environment. • 3. Explain the concept of a niche. • • Section 18-3: Energy Transfer • 1. Summarize the role of producers in an ecosystem. • 2. Identify several kinds of consumers in an ecosystem. • 3. Explain the important role of decomposers in an ecosystem. • 4. Compare the concept of a food chain with that of a food web. • 5. Explain why ecosystems usually contain only a few trophic levels. • • Chapter 19: Populations • SWBAT: • Section 19-1: Understanding Populations • 1. Define population. • 2. Describe the main properties that scientists measure when they study • populations. • 3. Compare the three general patterns of population dispersion. • 4. Identify the measurements used to describe changing populations. • 5. Compare the three general types of survivorship curves. • • Section 19-2: Measuring Populations • 1. Identify the four processes that determine population growth. • 2. Compare the exponential model and the logistic model of population growth. • 3. Differentiate between density-dependent and density-independent growth	

		• factors. • 4. Explain why small populations are more vulnerable to extinction. • • Section 19-3: Human Population Growth • 1. Explain how the development of agriculture changed the pattern of human • population growth. • 2. Describe the changes in human population size in the past 10,000 years. • 3. Compare observed patterns of population growth in developed and developing • countries. • • Chapters 20 & 21: Community Ecology/Ecosystems • SWBAT: • Section 20-1: Species Interactions • 1. Identify possible causes and results of interspecific competition. • 2. Compare parasitism, mutualism, and commensalism, and give one example • of each. • • Section 20-2: Patterns in Communities • 1. Explain ecological succession. • 2. Define a climax community. • 3. Describe the factors that affect species richness in a community. • • Section 21-1: Terrestrial Biomes • 1. Identify the eight major biomes and their characteristics. • • Section 21-2: Aquatic Ecosystems • 1. Identify the major ocean zones. • 2. Describe estuaries. • 3. Describe the freshwater wetlands. • • Chapter 22: Humans and the Environment • SWBAT: • Section 22-1: An Interconnected Planet • 1. Explain the natural functions of the ozone layer and greenhouse effect.	

		• 2. Discuss the value of biodiversity. • • Section 22-2: Environmental Issues • 1. Relate air pollution to effects on global climate. • 2. Describe how chemical pollutants may undergo biological magnification. • 3. Explain why extinctions and ecosystem disruption are of concern to humans. • • Section 22-3: Environmental Solutions • 1. Describe example of efforts to protect species and their habitats. • 2. Summarize international strategies for protecting entire ecosystems. • 3. List several things that individuals can do to help solve environmental problems.	
89-122 74-109	State: PA Core Standards (2014) CC.3.5.9-10.A,B,C,D,E,F,G,H,J State: PA State Standards (2002) 3.1.10.A,B,C,D,E 3.2.10.A,B 3.3.10.A,B,C,D 3.8.10.A 4.3.10.C 4.7.10.B	• Section 23-1: Prokaryotes • 1. Explain the phylogenic relationships between the domains Archaea, Bacteria, • and Eukarya. • 2. Describe the common methods used to identify bacteria. • 3. Identify five phyla of bacteria. • 4. Explain the importance of nitrogen-fixing bacteria. • • Section 23-2: Biology of Prokaryotes • 1. Describe the internal and external structure of prokaryotic cells. • 2. Identify the need for endospores. • 3. Compare four ways by which bacteria get energy and carbon. • 4. Identify the different types of environments in which bacteria live. • • Section 23-3: Bacteria & Humans • 1. Describe positive and negative ways by which bacteria impact upon humans. • 2. Explain how bacteria can develop resistance to antibiotics. • 3. Identify ways of preventing a food borne illness at home. • • Chapter 24: Viruses	May

		• SWBAT: • Section 24-1: Viral Structure and Replication • 1. Summarize the discovery of viruses. • 2. Describe why viruses are not considered living organisms. • 3. Describe the basic structure of viruses. • 4. Compare the lytic and lysogenic cycles of virus replication. • • Section 24-2: Viral Diseases • 1. Name several vectors of viral diseases. • 2. Identify four viral diseases that result in serious human illnesses. • 3. Discuss the relationship between viruses and cancer. • 4. Compare the effectiveness of vaccination, vector control, and drug therapy • in fighting viruses. • • Chapter 33: Sponges, Cnidarians, & Ctenophora • SWBAT: • Section 33-1: Porifera • 1. Identify the major characteristics of animals. • 2. Describe the basic body plan of a sponge. • 3. Describe the process of filter feeding in sponges. • 4. Contrast the processes of sexual and asexual reproduction in sponges. • • Section 33-2: Cnidaria & Ctenophora • 1. Describe the basic body plan of a cnidarian. • 2. Summarize how cnidarians feed. • 3. Identify and give example of the four classes of cnidarians. • 4. Describe the common characteristics of ctenophores. • • Chapter 34: Flatworms, Roundworms, & Rotifers • SWBAT: • Section 34-1: Platyhelminthes • 1. Summarize the distinguishing characteristics of flatworms. • 2. Describe the anatomy of a planarian. • 3. Compare free-living and parasitic flatworms.	

		• 4. Describe the life cycle of a tapeworm. • • Section 34-2: Nematoda & Rotifera • 1. Describe the body plan of a nematode. • 2. Outline the relationships between humans and parasitic roundworms. • 3. Describe the anatomy of a rotifer. • • Chapter 35/38: Mollusks, Annelids, & Echinoderms • SWBAT: • Section 35-1: Mollusks • 1. Describe the key characteristics of mollusks. • 2. Describe the body plans of mollusks. • 3. Name the characteristics of three major classes of mollusks. • 4. Compare the body plans of gastropods, bivalves, and cephalopods. • • Section 32-2: Annelids • 1. Identify the structure that provide the basis for dividing annelids into • three classes. • 2. List the advantages of body segmentation. • 3. Describe the structural adaptations of earthworms. • 4. Compare the three classes of annelids. • • Section 38-3: Echinoderms • 1. Describe the characteristics of echinoderms. • 2. Observe the structures of a sea star. • • Chapter 36/37: Arthropods • SWBAT: • Section 36-1: Phylum Arthropoda • 1. Describe the distinguishing characteristics of arthropods. • 2. Explain molting. • 3. List the four major subphyla of arthropods and give two examples of each. • • Section 36-2: Subphylum Crustacea • 1. Describe the characteristics of crustaceans. • 2. Compare terrestrial crustaceans with aquatic ones.	

		• 3. Summarize digestion, respiration, circulation, excretion, and neural control • in crayfish. • • Section 36-3: Subphyla Chilicerata & Myriaoda • 1. List the characteristics of arachnids, as represented by a spider. • 2. Explain the adaptations that spiders have for a predatory life on land. • 3. Identify the unique characteristics of scorpions, mites, and ticks. • 4. Compare the characteristics of millipedes and centipedes. • • Section 37-1: The Insect World • 1. List both the harmful and beneficial effects of insect on humans. • 2. Describe the external and internal structures of a grasshopper. • 3. Explain complete and incomplete metamorphosis. • • Chapter 39: Fish • SWBAT: • Section 39-1: Introduction to Vertebrates • 1. Identify the distinguishing characteristics of vertebrates. • 2. Explain the importance of jaws and paired appendages for fish. • • Section 39-2: Jawless & Cartilaginous Fish • 1. Identify three characteristics that make fish well suited to aquatic life. • 2. Describe three sensory systems in fish. • • Section 39-3: Bony Fish • 1. List three characteristics of bony fish. • 2. Distinguish between lobe-finned fish and ray-finned fish. • 3. Describe three key features of bony fish. • 4. Describe the function of the swim bladder. • 5. Discuss reproduction in bony fish. • • Chapter 40: Amphibians • SWBAT: • Section 40-1: Origin & Evolution of Amphibians	

		• 1. Describe the three preadaptations involved in the transition from aquatic • to terrestrial life. • 2. List five characteristics of living amphibians. • 3. Name the three orders of amphibians, and give an example of each. • • Section 40-2: Characteristics of Amphibians • 1. Identify three adaptations for life on land shown by the skeleton of a frog. • 2. Sequence the flow of blood through an amphibian's heart. • 3. Describe the respiratory, digestive, nervous, and excretory systems of • amphibians. • • Section 40-3: Reproduction in Amphibians • 1. Discuss the reproductive system of a frog. • 2. Describe the life cycle of a frog. • 3. Describe the changes that occur during metamorphosis in frogs. • • Chapter 41: Reptiles • SWBAT: • Section 41-1: Origin & Evolution of Reptiles • 1. Identify three factors that contributed to the success of dinosaurs. • 2. Identify the four modern orders of reptiles. • 3. Describe three characteristics of modern reptiles that make them well • adapted to life on land. • • Section 41-2: Characteristics of Reptiles • 1. Identify advantages associated with the structure of a reptile's heart. • 2. Describe four methods reptiles use to sense their environment. • 3. Explain how reptiles regulate their body temperature. • 4. Compare oviparity, ovoviviparity, and viviparity as reproductive strategies. • • Section 41-3: Modern Reptiles • 1. Compare the anatomy of turtles with that of other reptiles.	

		• 2. Describe two ways that snakes subdue their prey. • • Chapter 42: Birds • SWBAT: • Section 42-1: Origin & Evolution of Birds • 1. Identify and describe seven major characteristics of birds. • 2. List three similarities between birds and dinosaurs. • 3. Summarize the two main hypotheses for flight. • • Section 42-2: Characteristics of Birds • 1. Describe the structure of a contour feather. • 2. Identify two modifications for flight seen in a bird's skeleton. • • Section 42-3: Classification • 1. Describe the relationship between beak shape and diet in birds. • 2. List 10 major orders of birds, and name an example of each. • • Chapter 43: Mammals • SWBAT: • Section 43-1: Origin & Evolution of Mammals • 1. Describe the major characteristics of mammals. • 2. Differentiate between monotremes, marsupials, and placental mammals. • • Section 43-2: Characteristics of Mammals • 1. Explain the advantage of endothermy in mammals. • 2. Identify the features of the mammalian respiratory and circulatory systems • that help sustain a rapid metabolism. • 3. Describe the mammalian adaptations for obtaining food. • • Section 43-3: Diversity of Mammals • 1. Identify examples of the major orders of mammals.	