CURRICULUM MAP Honors Biology 1

Course/ Subject: Basic Biological Principles **Grade: 9** **Teachers: High School Biology Dept.**

Timeframe:

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)	Common Core Standards for Literacy Implementation Ideas- Science
1) Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms. 2) Compare and contrast cellular structures and their functions in prokaryotic and eukaryotic cells. 3) Describe and interpret relationships between structure and function at various levels of biological organization (i.e., organelles, cells, tissues, organs, organ systems, and multicellular organisms).	1)BIO.A.1.1.1 2)BIO.A.1.2.1 3)BIO.A.1.2.2	1a) Compare prokaryotic cells to eukaryotic cells 1b) Identify the characteristics that define life 2a) Identify the function of different organelles within the cell and interactions with each other 2b) Compare and contrast the differences in form and function of plant and animal cells 3) Sequence the levels of biological organization in order from least to most complex	1a) Formative :Venn Diagram RST9-10.5 1b) Think-Pair-Share 2a) Organelle Structure And Functions Chart RST9-10.2 2b) Cells Of The Body Microviewer Activity 2c) Cell Structure Coloring Pages 2d) Cell Story or Cell Catalog RST9-10.4, WHST9-10.2A 2e) Organelle and Function Test 2.b. Mystery Cell Lab RST9-10.3, RST9-10.7 3) Hiérarchy of Life Chart RST9-10.5	CCCSS.ELA-Literacy.9-10.5 CCCSS.ELA-Literacy.9-10.3 CCCSS.ELA-Literacy.9-10.5

Unit: Chemical Basis of Life
Timeframe:

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)	Common Core Standards for Literacy Implementation Ideas- Science
1) Describe the unique properties of water and how these properties support life on Earth (e.g., freezing point, high specific heat, cohesion). 2) Explain how carbon is uniquely suited to form biological macromolecules. 3) Describe how biological macromolecules form from monomers. 4) Compare and contrast the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms. 5) Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction. 6) Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.	1) BIO.A.2.1.1 2)BIO.A.2.2.1 3)BIO.A.2.2.2 4) BIO.A.2.2.3 5)BIO.A.2.3.1 6)BIO.A.2.3.2	1) Compare and contrast covalent and hydrogen bonds 2) Discuss properties and composition of water 3) Differentiate between acids and bases 4) Discuss unique properties of carbon 5) Describe dehydration synthesis and hydrolysis reactions 6) Compare and contrast the structure and function of biological macromolecules 7) Describe the main jobs of proteins 8) Demonstrate the four levels of protein structure 9) Describe the process of denaturation	1) Properties of Water Lab (RST.9-10.3)(RST.9-10.7) (WST.9-10.1d)(WST.9-10.1e) 2) Identify pH of various solutions 3) Effectiveness of Antacids Lab (RST.9-10.3)(RST.9-10.7)(WST.9-10.1d) (WST.9-10.2f) 4) Sketch or concept map of dehydration synthesis and hydrolysis (RST.9-10.2) 5) Concept map of carbohydrates, lipids, nucleic acids, and proteins (RST.9-10.5) 6) Identifying Inorganic and Organic Molecules Lab (RST.9-10.3)(RST.9-10.7) (WST.9-10.1d) (WST.9-10.2f) 7) Carbohydrates, Proteins, Lipids Cut and Paste Activities (RST.9-10.4) 8) Catalase Lab (RST.9-10.3) (RST.9-10.7) (WST.9-10.1d) (WST.9-10.2f) 9) Chapter Test	

Unit: Bioenergetics
Timeframe:

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)
1) Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations.	1) BIO.A.3.1.1	1) Identify the specialized structures and function of mitochondria and chloroplasts.	1)Coloring Activities RST9-10.5
2) Compare and contrast the basic transformation of energy during photosynthesis and cellular respiration.	2) BIO.A.3.2.1	2a) Evaluate the impact of cellular processes on the biological community 2b)Explain the interdependence of the processes of photosynthesis and cellular respiration	2a) Global Warming Article RST9-10.1;RST9-10.2: WHST.9-10.1b; WHST.9-10.1e 2b) Photofinish Lab RST0-10.3;RST9-10.7; WHST.9-10.2f 2c) Got Energy?Lab RST9-10.3;RST9-10.7; WHST.9-10.2f 2d) Yeast Respiration Lab RST9-10.3;RST9-10.7; WHST.9-10.2f 2e) Food Burning Lab RST9-10.3;RST9-10.7; WHST.9-10.2f
3) Describe the role of ATP in biochemical reactions	3) BIO.A.3.2.2	3) Describe the relationship between the structure of organic molecules and the function they serve in living organisms	3) ATP Cycle Cutout Activity RST9-10.5 Chapter Test

Unit: Homeostasis and Transport
Timeframe:

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)
1) Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell. 2) Compare and contrast the mechanisms that transport materials across the plasma membrane (i.e., passive transport -- diffusion, osmosis, facilitated diffusion; active transport -- pumps, endocytosis, exocytosis). 3) Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell. 4)Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).	1) BIO.A.4.1.1 2) BIO.A.4.1.2 3) BIO.A.4.1.3 4)BIO.A.4.1.3	describe the role of the plasma membrane in regulating cell activities and protecting the cell. compare the various mechanisms of passive and active transport. relate the structures of membrane-bound organelles to their functions in energy transfer and transportation of materials. Demonstrate homeostasis dynamically returns biological changes (body temperature, osmolarity, blood pressure, pH, blood glucose, etc.) to balance by modifying chemical reactions, adjusting energy transformations, and responding to environmental changes.	Surface area to volume activity RST9-10.1, RST9-10.3 Diffusion and osmosis lab RST9-10.3;RST9-10.7 WHST.9-10.2f, WHST.9-10.1e Vinegar Egg shell lab RST9-10.3;RST9-10.7 WHST.9-10.2f, WHST.9-10.1e Plasmolysis lab RST9-10.3;RST9-10.7 WHST.9-10.2f, WHST.9-10.1e Transport concept map RST0-10.5 WHST.9-10.2a Got Energy Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e

Unit: Cell Growth and Reproduction
Timeframe –

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)
1) Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.	1) BIO.B.1.1.1	1a) Identify and describe the three main stages in the cell cycle 1b) Identify the changes and events that occur in cells before and during mitosis. 1C) understand the problem cell growth causes and how cell division solves the cell growth problem	1a) Cell Cycle Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e 1b) Cell Cycle Poster RST9-10.5 1c) Meiosis Bead Activity 1d) Meiosis Web quest RST9-10.7
2) Compare and contrast the processes and outcomes of mitotic and meiotic nuclear divisions.	2) BIO.B.1.1.2	1) Differentiate between mitosis and meiosis.	1) Venn Diagram RST9-10.5
3) Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.	3) BIO.B.1.2.1	3a) Determine the relationship between alleles and genes 3b) Summarize the events of DNA replication and explain the result of replication 3c) Model the steps of DNA replication. 3d) Explain how the process of DNA replication relates to heredity	3a) DNA Replication Activity RST9-10.5 3b) DNA Model Activity 3c) DNA Origami Activity
4) Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritance.	4) BIO.B.1.2.2	4) Explain the roles of DNA, genes, alleles, and chromosomes in inheritance	4a)Strawberry DNA Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e 4b) Build a Frog Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e 4c) DNA to RNA cut-out Activity

Unit: Genetics
Timeframe –

NATIONAL BENCHMARKS	STATE STANDARDS	COMPETENCIES/SKILLS	ASSESSMENT
1) Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).	1) BIO.B.2.1.1	Students create *Patterns of Inheritance* concept map Perform punnet squares on all patterns of inheritance	Summative assessment on Inheritance patterns Coin Flip Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e
2) Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).	2) BIO.B.2.1.2	Recognize the difference between point and chromosomal mutations and the effect of protein	ABO Blood Type Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e Pipe Cleaner Baby Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e Genetic Disorder Brochure Project WHST.9-10.6; WHST.9-10.8
3) Describe how the processes of transcription and translation are similar in all organisms.	3) BIO.B.2.2.1	Describe a Genetically Modified Organisms explain the processes of transcription, translation, and protein modification	Jigsaw Reading RST9-10.1;RST9-10.2 DNA Fingerprinting Activity
4) Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.	4) BIO.B.2.2.2	describe the role of the Endoplasmic Reticulum and Golgi apparatus in protein synthesis	Mutation Concept Map RST9-10.5
5) Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift).	5) BIO.B.2.3.1	explain the effects of a point or frame-shift mutation on the polypeptide describe the kinds of chromosomal mutations that can occur. relate them to changes in the DNA that may result in a change in phenotype	Karyotype Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e Human Characteristics Activity
6) Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).	6) BIO.B.2.4.1	Students will understand how genetic engineering can effect the genome of other organisms	Online Activities

Unit: Evolution
Timeframe: 8 weeks

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)
1) Explain how natural selection can impact allele frequencies of a population.	1) BIO.B.3.1.1	1a Compare and contrast adaptation to environment within a species. 1b. Apply the concept of survival of the fittest.	1a. Birds on an Island Lab RST9-10.3;RST9-10.7
2) Describe the factors that can contribute to the development of new species (e.g., isolating mechanisms, genetic drift, founder effect, migration).	2) BIO.B.3.1.2	2a. describe factors that may lead to the development of new species: isolating mechanisms, genetic drift, founder effect, and migration. 2b) sequence events that can lead to reproductive isolation of two populations	2a. Hominid Skulls Lab RST9-10.3;RST9-10.7 WHST.9-10.7; WHST.9-10.1c
3) Explain how genetic mutations may result in genotypic and phenotypic variations within a population.	3) BIO.B.3.1.3	3a. explain how genetic mutations may result in genotypic and phenotypic variations within a population. 3b. analyze the results of scientific studies to determine whether genetic mutations can be beneficial	3a. Peppered Moth Simulation RST9-10.2 3b. Pesticide Resistance Online Activity RST9-10.2 3c. How is Camouflage and Adaptive Advantage Lab RST9-10.3;RST9-10.7; WHST.9-10.7; WHST.9-10.1c
4) Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical, and universal genetic code).	4) BIO.B.3.2.1	4a. Compare and contrast amino acids found in various organisms. 4b. Analyze homologous structures in fossil records.	4a. Amino Acid Sequence Comparison Activity. RST9-10.7 4b. Homologous Structure Coloring Activity 4c. The Great Fossil Find 4d. Interpreting Fossil Evidence
5) Distinguish among the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation.	5) BIO.A.3.3.1	5. Define and distinguish between core scientific vocabulary.	5a. Create a master list of core vocabulary. RST9-10.4 5b. Create descriptions for each vocabulary word RST9-10.4;RST9-10.5

6) Understand that evolution builds on what already exists, so the more variety there is, the more there can be in the future. But evolution does not necessitate long-term progress in some set direction. Evolutionary change appears to be like the growth of a bush: Some branches survive from the beginning with little or no change; many die out altogether; and others branch repeatedly, sometimes giving rise to more complex organisms.	6) BIO.B.3.1.2	1. Compare and contrast adaptation to environment within a species (natural selection) 2. Relate the biological species concept to the modern definition of species 4. Explain how the isolation of populations can lead to speciation i.e. reproductive isolation, temporal isolation, pre-zygot6ic vs. post zygotic isolation, mechanical isolation, behavioral isolation, etc… 5. Compare two kinds of isolation and the pattern of speciation associated with each 6. Compare and contrast amino acids found in various organisms 7. List the five conditions in which evolution may take place 8. Use the Hardy-Weinberg equation to provide mathematical proof that evolution occurs 9. Describe how convergent evolution can result among different species 10. Explain how divergent evolution can lead to species diversity 11. Compare artificial selection and natural selection	1. Five Fingers of Evolution Video 2. Speciation Concept Map 3. T-Chart Activity on Convergent and Divergent Evolution 4. Venn Diagram on Pre-zygotic vs. Post-zygotic isolation 5. See # 4 above 6. DNA/Protein Analysis Lab 7. Unit Exam

Unit: Ecology
Timeframe:

National Benchmark being addressed	State Standards-	Skills/Competencies	Assessment (common or individual; formative or summative)
1) Describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, biosphere).	1) BIO.B.4.1.1	1) Sequence the levels of biological organization in order from least to most complex.	1) Make a foldable that list and describe the levels of biological organization. RST9-10.5
2) Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.	2) BIO.B.4.1.2	2) research the connections between factors that determine biome development including a physical map, and plant and animal populations	2a) Create-a-biome concept map RST9-10.5 2b) Biome Foldable RST9-10.5
3) Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).	3) BIO.B.4.2.1	3a) Sequence a food chain to show the transfer of energy. 3b) Describe the roles of organisms in a food web in terms of energy flow in an ecosystem. 3c) Explain why food webs are more appropriate models than food chains to show ecosystem interactions	3a) Food Web Lab RST9-10.3;RST9-10.7; WHST.9-10.2f, WHST.9-10.1e 3b) Interactive Food Web Activity
4) Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).	4) BIO.B.4.2.2	4a) Describe biotic interactions between organisms in a food chain. 4b) Define and describe the possible ecological relationships between species that coexist in an ecosystem 4c) Classify specific interspecies relationships as mutualistic, commensal, or parasitic	4a) PBS Symbiotic Strategies Lesson 4b) Concept Map RST9-10.5
5) Describe how matter recycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, nitrogen cycle).	5) BIO.B.4.2.3	5a) Compare cycles of matter with conservation of energy in ecosystems. 5b) Identify the major cycles in nature (Carbon Cycle, Nitrogen Cycle, Water Cycle) and how they relate to organisms	5a) Chemical Cycle Paper RST9-10.5; WHST.9-10.8

6) Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires). 7) Describe the effects of limiting factors on population dynamics and potential species extinction.	6) BIO.B.4.2.4 7) BIO.B.4.2.5	6) Predict the role of human beings on ecological succession 7) Compare and contrast limiting factors in a population	6) Case study on human influences RST9-10.5 7a) Carrying Capacity Lab RST9-10.3;RST9-10.7; WHST.9-10.7; WHST.9-10.1c 7b) Carrying capacity graphing activity