Biology Curriculum Map

Biology From Molecules to Organisms

Standard: LS1 From Molecules to Organisms	***Performance Expecation:*** LS1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and or other large carbon-based molecules. LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.
Essential Question: What is Biology? How are problems solved in Biology? What are cells and what are they made up of? How does photosynthesis work and how is it related to respiration? What is respiration and how does it related to photosynthesis?	***Science and Engineering Practices:*** Developing and Using Models Planning and Carrying out investigations Constructing Explanations and Designing Solutions
Disciplinary Core Idea: Structure and Function Growth and Development of Organisms Organization for Matter and Energy Flow in Organisms	***Crosscutting Concepts***: Systems and Systems Models Structure and Function
Resources: See Quivers	***Assessments:*** Lab report, Video summaries, Text summaries, Case Study Debate, Chapter Test
Vocabulary: Scientific Method Observations Hypothesis Dependent Variable Independent Variable	 RNA ATP Membrane Cytoplasm Ribosomes

Control Theories Laws Gene Chromosome Homeostasis Evolution Natural Selection Adaptation Stimulus Response Reproduction Cell Organism Symbiosis Competition Tissue Organ System Population Community Ecosystem Biome Biodiversity Energy Exothermic Endothermic Activation Energy Polarity Enzyme Catalyst Organic Monomer Polymer Proteins Carbohydrates Lipids Nucleic Acids Amino Acids DNA	Colony Unicellular Multicellular Osmosis Solute Solvent Solution Hypertonic Hypotonic Isotonic Equilibrium Photosynthesis Respiration Autotroph Heterotroph Chemosynthesis Glucose Chloroplast Endosymbiosis Grana Thylakoid Chlorophyll Stroma Electron Transport Chain Light Reactions Dark Reactions Calvin Cycle Stomata

What is Biology Checklist

Day One

- Syllabus _____
- Intro, Quivers, Projects, Notebooks
- Start Buffer Investigation

Day 2

- Buffer Investigation _____

Day 3

- TED Variables Vod Quiz _____
- Big Ideas Vod Quiz _____

Day 4

- Simpson's Variables _____
- Ch 1 Outline and Review _____
- Ch 2 Outline and Review _____

Day 5

- Ghostbusters Evaluation _____
- Ch 3 Outline and Review _____

Day 6

- Scientific Method Scenarios_____
- Graphing _____

Day 7

- Finish all work
- Study for Quiz 1

Day 8

- Quiz 1 _____
- Start Origins Debate

Day 9

- Origins Debate _____

Day 10

- Heirarchy of Life Vod _____
- Structure and Function Vod _____

Day 11

- Ch 4 Outline and Review _____
- Ch 5 Outline and Review _____
- Ch 6 Outline and Review _____

Day 12

- Beaks and Feet _____
- Ch 7 Outline and Review _____
- Ch 8 Outline and Review _____

Day 13

- Finish all work
- Study for test

Day 14

- What is Biology Test

Quivers	
Question	What is Biology? How are problems solved in science?
Investigation	Buffers Investigation (Vernier)
Video	TED Variables, Big Ideas Vod
	Heirarchy of Life, Structure and Function
Elaborate	Ch 1, Ch 2, Ch 3, Simpson's Variables,
	Ghostbusters Eval, Scientific Method Scenarios, Graphing
	Exercise, Origins Debate
	Ch 4, Ch 5, Ch 6, Ch 7, Ch 8, Beaks and Feet,
Review	
Summary Quiz	

What are cells and what makes them up?

Day 1

- What is Biology Test
- Molecules of Life Vod _____
- Information Processing Vod _____

Day 2

- Cell Size Lab _____
- Ch 9 Outline and Rev _____

Day 3

- Occurrence of Water Lab _____
- Ch 10 Outline and Rev _____

Day 4

- Ch 11 Outline and Rev _____
- Enzyme Lab _____

Day 5

- Tour of a Cell Vod _____
- Ch 12 Outline and Rev _____
- Cell Research and Design (Start)

Day 6

- Finish Cell Research and Design _____
- Ch 13 Outline and Rev _____

Day 7

- Cheek Cell Virtual Lab _____
- Ch 14 Outline and Rev _____

Day 8

- Osmosis Lab _____
- Ch 15 Outline and Rev

Day 9

- Biological Membranes Lab _____

Day 10

- Finish all Work
- Rev. for test

Day 11

- What are cells and how do they work test

Quivers -	What are Cells?
Question	What are cells and what makes them up?
Investigation	Energy in Food
Video	Molecules of Life, Informaion Processing,
	Tour of a Cell,
Elaborate	Occurance of Water, Enzyme Lab, Osmosis Lab,
	Cheek Cell Virtual Lab, Cell Research and Design
	Limitations of Cell Size, Biological Membranes (V)
	Diffusion Through Membranes (V)
Review	
Summary Quiz	

Photosynthesis Checklist

Day One

- Cell Test
- Matter and Energy Video _____

Day Two

- Intro Photosynthesis/Respiration Project
- Photosynthesis Video _____
- Photosynthesis and Respiration Video _____

Day Three

- Project Proposal _____
- Photosynthesis PBL _____
- Ch 3 Outline and Review _____

Day Four

- Leaf Chromatography _____
- Ch 4 Outline and Review _____

Day Five

- Photosynthesis Simulation _____
- Ch 5 Outline and Review _____

Day Six

- Photosynthesis Lab _____
- Ch 6 Outline and Review _____

Day Seven

- Work on Project _____
- Ch 7 Outline and Review _____

Day Eight

- Ch 8 Outline and Review _____
- Finish all other work
- Study for Test

Day Nine

- Photosynthesis Test

Quivers	What is Photosynthesis?
Question	How does photosynthesis work and how is it related
	to respiration?
Investigation	Photosynthesis Project of student design and Photosynthesis
	Respiration Project
Video	Matter and Energy, Photosynthesis, Photosynthesis and
	Respiration, Photosythesis Lab (V)
Elaborate	Photosynthesis PBL, Leaf Chromatography, Photosynthesis
	Simulation,
Review	
Summary Quiz	

Respiration Checklist

Day One

- Photosynthesis Quiz _____
- Respiration Video _____
- Ch 9 Outline and Review _____

Day Two

- Mystery of the Seven Deaths _____
- Ch10 Outline and Review _____

Day Three

- Work on Photo/Resp Project

Day Four

- Respiration Virtual Lab _____
- Ch 11 Outline and Review _____

Day Five

- Fermentation Lab _____
- Ch 12 Outline and Review _____

Day Six

- Sugar Fermentation Lab _____
- Ch 13 Outline and Review _____

Day 7

- Projects
- Ch 14 Outline and Review _____

Day 8

- Finish Projects _____
- Study for Quiz _____

Day 9

- Quiz over Cell Respiration

Quivers	What is respiration?
Question	What is respiration and how does it relate to
	photosynthesis?
Investigation	Mystery of the Seven Deaths
Video	Respriation
Elaborate	Respiration Virtual Lab, Fermentation Lab
	Sugar Fementation Lab (V)
Review	
Summary Quiz	

Cell Division Checklist

Day One

- Respiration Quiz
- Mitosis Video _____
- Ch 1 Outline and Review _____

Day Two

- Stop Motion Mitosis/Meiosis Project
- Ch 2 Outline and Review _____

Day Three

- Finish Project _____
- Mitosis and Meiosis Video _____
- Meiosis Video _____

Day Four

- Cell Specialization Video _____
- Mitosis Work _____
- Ch 3 Outline and Review _____

Day Five

- Cell Counting Lab _____
- Ch 4 Outline and Review _____

Day Six

- Meiosis Case Study _____
- Ch 5 Outline and Review _____

Day Seven

- Cells Alive _____
- Karyotyping Lab _____
- Ch 6 Outline and Review _____

Day Eight

- Cancer Video _____
- Cancer Actiity _____
- Ch 7 Outline and Review _____

Day Nine

- Saving Superman _____

Day Ten

- Finish all work
- Study for Quiz

Day 11

- Cell Division Quiz _____

Quivers	Why and how do cells divide?
Question	Why and how do cells divide?
Investigation	Mitosis Meiosis Project Stop Motion Movie
Video	Mitosis,Mitosis and Meiosis, Meiosis
	Cell Specialization, TED Cancer
Elaborate	Mitosis Work, Cell Counting Lab, Meiosis
	Case Study, Cells Alive, Karyotyping,
	Saving Superman, Cancer Activity
Review	
Summary Quiz	

Biology Curriculum Map - Heredity

Biology

Standard: HS-LS 3 Heredity: Inheritance and Variation of Traits	***Performance Expectation:*** HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. HS-LS3-2.Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors HS-LS3-3.Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
Essential Question: How is gene expression controlled in humans? How did Mendel Discover Genetics? What are Punnett Squares and how do we use them?	***Science and Engineering Practices:*** Analyzing and interpreting data Engaging in Arguments from Evidence
Disciplinary Core Idea: Structure and Function Inheritance of Traits Variation of Traits	***Crosscutting Concepts***: Cause and effect Scale proportion and quantity Science is a Human Endeavor
Resources: See Quivers and Checklist	***Assessments:*** Case studies, labs, quizzes, tests, video and chapter summary sheets, Punnett square worksheets.
Vocabulary: Central Dogma DNA RNA Amino Acids Proteins Transcription Translation Replication Transformation mRNA	 Virus Chargaff's Rules Adenine Thymine Cytosine Guanine Uracil Double Helix Nucleotide Protein Synthesis

tRNA	Polymerase
rRNA	Helicase
Introns	Genetic Code
Exons	Codon
Mutation	Deletion
Point mutation	Insertion
Frameshift mutation	Substitution
Mutagen	Gene Expression
Repressor	Lac operon
Autosomes	Chromosomes
Genes	Alleles
Mendel	Genotype
Dominant	Phenotype
Recessive	Sex-linked traits
Homozygous	Self-Pollination
Heterozygous	Cross-Pollination
Law of Segregation	Heredity
Law of Independent Assortment	Probability
Punnet Square	Codominance
Incomplete Dominance	Polygenic

DNA/RNA Checklist

Day 1

DNA Folding Activity _____

Twisting Tale of DNA Video _____

Day 2

What is DNA Video _____

The Book of You Video _____

Day 3

Ch 1 Outline and Review _____

Ch 2 Outline and Review _____

Ch 3 Outline and Review _____

Day 4

DNA Structure Worksheet _____

Finish all work

Study for Quiz

Day 5

Structure of DNA Quiz _____----------

Protein Synthesis Words Project _____

Day 6

Meselson Stahl Experiment Video _____

DNA Replication Video _____

Transcription and Translation Video _____

Day 7

DNA Extraction Lab _____

DNA Fingerprinting Video _____

Ch 4 Outline and Review _____

Day 8

Kicking out Genes Virtual Lab _____

Ch 5 Outline and Review _____

Ch 6 Outline and Review _____

Day 9

Protein Production Packet _____

Ch 7 Outline and Review _____

Ch 10 Outline and Review _____

Day 10

Jurasic Park Worksheet _____

Ch 11 Outline and Review _____

Day 11

Finish all Work

Study for Quiz

Day 12

Replication, Transcription, Translation Quiz _____----------

House MD Genetic Disease Pamphlet _____

Day 13

Mutations Video _____
Ch 8 Outline and Review _____
Ch 9 Outline and Review _____

Day 14

Ch 12 Outline and Review _____
Ch 13 Outline and Review _____

Day 15

Review for Unit 3 Test, Finish Checklist

Day 16

Unit Test
Start Heredity

Quivers	
Question	What is the structure of DNA?
Investigation	DNA Folding Activity
Video	Twisting Tale, What is DNA?, The Book of You
Elaborate	Ch 1, Ch 2, Ch 3, DNA Strucutre Wksht
Review	
Summary Quiz	

Quivers	
Question	How does DNA make proteins?
Investigation	Protein Synthesis Word Project
Video	Meselson Stahl, DNA Replication, Transcription
	Translation, DNA Fingerprinting, Simulation
Elaborate	Ch 4, 5, 6, 7, 10, 11, Knocking out the Genes
	DNA Extraction, Protein Production Packet,
	Jurasic Park
Review	

Quivers	
Question	What happens when mistakes are made
Investigation	Genetic Disease Pamphlet
Video	Mutations
Elaborate	Ch 8,9,12,13
Review	

Genetics Checklist

Day 1

- Pedigree Activity _____
- Start Blue People CS

Day 2

- Blue People CS _____
- Vod Quiz _____

Day 3

- Alzheimer's CS _____
- Ch 1 Practice _____

Day 4

- Red Wolf Mating _____
- Ch 2 Practice _____

Day 5

- Ch 3 Practice ____
- Study for Quiz 1

Day 6

- Quiz Section 1 _____
- Start Genetics and DNA Web

Day 7

- Genetics and DNA Web _____
- Vod Quiz 2 _____
- Ch 4 Practice and Review _____

Day 8

- Basic Principles of Genetics _____
- Ch 5 Practice I _____

Day 9

- Ch 6 Review _____
- Ch 7 Practice and Review _____
- Review for Quiz

Day 10

- Section 2 Quiz _____
- Start Baby Face Lab

Day 11

- Baby Face Lab _____

Day 12

- Vod Quiz _____
- SpongeBob I _____

Day 13

- SpongeBob II _____
- Ch 8 Rev _____

Day 14

- Co dominance incomplete dominance _____
- Ch 9 Practice and Review _____

Day 15

- SpongeBob Incomplete Dominance _____

Dihybrid Cross _____
Ch 10 Practice and Review _____

Day 16

Finish Checklist
Study for Unit Test

Day 17

Unit Test

Quivers	
Question	How are traits passed through families?
Investigation	Pedigree Interpretation Activity
Video	Ressurection, Heredity
Elaborate	Blue People Case Study, Alzheimer's Case Study, Red Wolf
	Mating Lab, Ch 1, Ch 2, Ch 3
Review	
Summary Quiz	

Biology Curriculum Map

Biology Evolution

Standard: HS-LS4 Biological Evolution: Unity and Diversity	***Performance Expectation:*** LS4-1 **Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.** LS4-2 **Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.** **LS4-4 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.** **LS4-5 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.**
Essential Question: How are organisms classified? What is the evidence for Evolution? How do living things change over time?	***Science and Engineering Practices:*** Analyzing and Interpreting Data Develop and using models. Using mathematics and computational thinking. Constructing Explanations and Designing Solutions. Engaging in Argument for Evidence
Disciplinary Core Idea: Evidence of Common Ancestory and Diversity Natural Selection Adaptation	***Crosscutting Concepts***: Patterns Cause and Effects

Biodiversity and Humans Developing Possible Solutions	
Resources: See Quivers and Checklist	***Assessments:*** Case studies, simulations, quizzes, tests, video and chapter summary sheets, field guide from webquest,
Vocabulary: Community Abiotic Biotic Ecosystem Species Niche Habitat Population Species Producer Consumer Herbivores Trophic Level Nutrients Terrestrial Tundra Temperate Forest Grasslands Chaparral Desert Tropical Forest Marine Intertidal Reefs Weather Dormancy	 Carnivore Omnivore Predator Prey Scavenger Decomposer Symbiosis Mutualism Commensalism Parasitism Food Chain Food Web Ecological Pyramid Biomass Freshwater Limnology Photic Aphotic Wetlands Marshes Swamps Chemosynthesis Plankton Climate Biodiversity

Biology Evolution Checklist

Day 1

An Antipodal Mystery Case Study _____

Day 2

Phylogenetics Vod_____

Ch 1 Outline and Review _____

Day 3

Field Camp Activity _____

Ch 2 Outline and Review _____

Review for Quiz

Day 4

Quiz Section 1 _____

Evolution Lab Simulation _____

Day 5

Evidence for Evolution Vod _____

Evolution Continued Vod _____

5 Fingers of Evolution Vod _____

Day 4

Ch 3 Outline and Review _____

Ch 4 Outline and Review _____

Age of Artifacts _____

Day 5

Ch 5 Outline and Review _____

Ch 13 Outline and Review _____

Study for Quiz 2

Day 6

Quiz 2 _____

Start Lizard Island

Day 7

Finish Lizard Island _____

Natural Selection Vod _____

Day 8

Examples of Natural Selection Vod _____

Speciation and Extinction Vod _____

Day 9

Ch 6 Outline and Review _____

Ch 7 Outline and Review _____

Ch 8 Outline and Review _____

Day 10

Natural Selection Sim _____

Day 11

Sex and the single guppy _____

Day 12

Finish all work and study for Evolution Test

Quivers	
Question	How are living things classified?
Investigation	Antipodal Case Study
Video	Phylogenetics,
Elaborate	Ch 1,2, Field Camp Activity
Review	
Summary Quiz	

Quivers	
Question	What is the evidence for evolution?
Investigation	Evolution Lab Simulation
Video	Evidence for Evolution, Continued, 5 Fingers
	of Evolution
Elaborate	Ch 3, 4, 5, 13, Age of Artifacts,
Review	

Quivers	
Question	How do organisms change over time?
Investigation	Lizard Island
Video	Natural Selection, Examples, Speciation
	and Extinction
Elaborate	Ch 6,7,8, Natural Selection Sim,
	Sex and the single guppy
Review	