

CV Guarantee (Ag Bio/9-12)

Big Idea: Cell Division – Mitosis and Meiosis			
Standard: HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. <u>LS1.A: Structure and Function</u> <u>LS1.B: Growth and Development of Organisms</u>		Timeline: 1.5-3 Weeks	
Key Vocabulary: Cell cycle, Meiosis, Mitosis, Prophase, Metaphase, Anaphase, Telophase, ATP, Cellular Energy, Interphase, Cytokinesis, Chromosomes, Autosomes.		Vocabulary Activities: KaHoot, Matching Quiz, Labeling pictures, Vocab bingo	
Knowledge	Reasoning	Performance Skills	Product Examples
Explain and identify typical stages in a cell's life cycle Recognize the different stages in Meiosis I and Meiosis II Understand cell division through Mitosis and Meiosis	Compare and Contrast Mitosis and Meiosis Summarize the regulation of the cell cycle	Observe Cell division with Mitosis and Meiosis	Make a flip book showing all stages of Mitosis <i>and</i> Meiosis Model cell division to peers
Resources:			

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Big Idea: Cell Structure and Function			
<p>Standard: HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.</p> <p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> • <u>Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1)</u> 		<p>Timeline: 3-5 weeks</p>	
<p>Key Vocabulary: Atoms, molecules, cells, organism, eukaryote, prokaryote, cell structure, organelles, cytoplasm, cell wall, nucleus, plant cell, animal cell, microscope, diaphragm, aperture, focus, stage clips, stage</p>		<p>Vocabulary Activities: Identification test, KaHoot, Quizlet, Vocab Bingo, Jeopardy, Matching</p>	
Knowledge	Reasoning	Performance Skills	Product Examples
<p>Understand the structure and function of cells</p> <p>Define the organelles of a cell and their role in the cell</p> <p>Recognize the differences between plant and animal cells</p>	<p>Compare and contrast Prokaryotes and Eukaryotes</p> <p>Compare and contrast the structure of an animal cell to a plant cell</p>	<p>Investigate a cell and determine how cell organelles operate similar to that of a city</p> <p>Observe cells through a microscope</p>	<p>Design and produce their own cell with its organelles and their jobs in the cell</p> <p>Draw out a cell and it's major functioning organelles</p>
Resources:			

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Big Idea: Ecology			
<p>Standard: HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</p> <p>HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.</p> <p><u>LS1.C: Organization for Matter and Energy Flow in Organisms</u> <u>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems</u></p>		<p>Timeline:</p> <p>4-6 weeks</p>	
<p>Key Vocabulary: Biome, biosphere, ecosystem, community, population, organism, species, autotroph, heterotroph, producers, consumers, herbivore, carnivore, detritivore, omnivore, decomposer, food chain, food web, water cycle, carbon cycle, nitrogen cycle, biotic, abiotic factors, symbiotic interactions, competition, mutualism, parasitism, commensalism, living, non-living.</p>		<p>Vocabulary Activities:</p> <p>Word bingo, KaHoot, Quizlet Live, Notes, Oral questioning, Matching vocab</p>	
Knowledge	Reasoning	Performance Skills	Product Examples
<p>Explain the levels of organization in Ecology</p> <p>Define Energy Flow in ecosystems</p> <p>Recognize Consumers and Producers from one another</p>	<p>Classify differences between consumers and producers, and feeding relationships</p> <p>Predict outcomes of feeding relationships in an ecosystem</p> <p>Compare the levels of organization in biology to one another</p>	<p>Conduct lab experiments signifying the differences between symbiotic interactions</p> <p>Observe symbiotic relationships</p> <p>Observe the flow of energy in the water cycle, nitrogen cycle, and carbon cycle</p>	<p>Produce a demonstration to the class with levels of organization and the symbiotic interactions in each</p> <p>Draw and write the Energy Flow of the nutrient cycles</p>
Resources:			

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Big Idea: Evolution and Taxonomy

Standard:

- HS-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.
- HS-LS4 -3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- HS-LS4 -4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

Timeline:

3-6 weeks

Key Vocabulary:

Evolution, Taxonomy, Lamarck, Darwin, Wallace, Postulates, Natural Selection, Extinction, Radioactive dating, Classification, Eubacteria, Archaea, Protista, Fungi, Plantae, Animalia, Kingdom, Phylum, Class, Order, Family, Genus, Species

Vocabulary Activities:

KaHoot, Bingo, Flashcards, Quiz

Knowledge	Reasoning	Performance Skills	Product Examples
<p>Recognize that evolution involves a change in allele frequencies</p> <p>Identify the seven major taxonomic categories</p>	<p>Analyze the effects of mutations</p> <p>Evaluate evolution in terms of evidence</p>	<p>Investigate the processes of relative and radioactive dating to determine the age of fossils</p>	<p>Display mass extinction events using a timeline</p> <p>Draw out characteristics used to classify Protists</p>

	Infer the differences of characteristics among different domains	Observe the structures and characteristics of viruses with living and non-living things	
Resources:			

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Big Idea: Heredity & Evolution			
<p>Standard:</p> <p>HS-L Communicate scientific information that common S4-1 ancestry and biological evolution are supported . by multiple lines of empirical evidence.</p> <p>HS-L Construct an explanation based on evidence S4-2 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.</p> <p>HS-L Apply concepts of statistics and probability to S3-3 explain the variation and distribution of . expressed traits in a population.</p>		<p>Timeline:</p> <p>2-3 weeks</p>	
<p>Key Vocabulary:</p> <p>Gregor Mendel, Independent assortment, Probability, Punnett Squares, Genetics, Laws of Heredity, genotype, phenotype, heterozygous, homozygous, dominant, recessive, simple dominance, co-dominance</p>		<p>Vocabulary Activities:</p> <p>KaHoot, Oral examination, Matching Vocab, Vocab worksheets</p>	
Knowledge	Reasoning	Performance Skills	Product Examples
<p>Understand Heredity and the work of Gregor Mendel</p> <p>Define probability in Punnett Squares</p>	<p>Summarize the outcomes of Gregor Mendel's experimental procedures</p> <p>Analyze the historically significant work of prominent geneticists</p>	<p>Conduct setting up and solving a Punnett Square</p> <p>Operate a Punnett Square using co-dominance and incomplete dominance</p>	<p>Produce example of heredity and draw out Punnett square to solve for outcomes</p> <p>Make key outlining differences between Mendelian genetics and Punnett Squares</p>

Resources:

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Big Idea: Molecular Basis of Heredity (DNA & RNA)

Standard:

HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

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.

LS3.A: Inheritance of Traits

LS3.B: Variation of Traits

Timeline:

3-5 weeks

Key Vocabulary:

Molecular biology, Deoxyribonucleic acid (DNA), Ribonucleic acid (RNA), genes, transcription, translation, adenine, thymine, cytosine, guanine, double helix, single helix, James Watson, Frances Crick, Nucleotide, mutations, base pairs.

Vocabulary Activities:

Matching, Vocab Bingo, Repetition, Worksheets, Oral examination, Kahoot

Knowledge

Describe the Watson-Crick double helix model of DNA using the base pairing rule

Describe the processes of replication

Reasoning

Compare and contrast the structure and function of DNA and RNA

Summarize transcription and translation

Analyze the structure and function of nucleic acids found in living systems

Performance Skills

Investigate the molecular basis of genetics

Observe new DNA technologies and their advancements

Product Examples

Model the components of a DNA nucleotide and a RNA nucleotide

Draw the processes of replication

Resources:

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Big Idea: Physiology - Vertebrates and Invertebrates

Standard:

HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms

LS1.C: Organization for Matter and Energy Flow in Organisms

Timeline:

3-5 Weeks

Key Vocabulary:

Vertebrates, Invertebrates, Anatomy Nervous system, Respiratory system, Excretory system, Circulatory system, Digestive system, Sexual reproduction, Asexual reproduction, Metamorphosis

Vocabulary Activities:

KaHoot, Dissection and labeling, Worksheets, Word search, Vocab presentations

Knowledge

Describe the major differences of classes in invertebrates

Recognize sexual vs. asexual reproduction in animals

Reasoning

Compare and contrast the major invertebrate classes according to their systems

Performance Skills

Observe the life cycles of familiar organisms
Conduct dissection experiments to identify different classes of systems

Product Examples

Display the major invertebrate phyla and major characteristics of anatomical features
Draw out the five major systems in invertebrate classes

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Big Idea: Plants and Animal Characteristics			
<p>Standard: HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*</p> <p>CTE.ANR.C.C11.5 Understand the photosynthesis process and the roles of the sun, chlorophyll, sugar, oxygen, carbon dioxide, and water in the process.</p>		<p>Timeline: 2-3 Weeks</p>	
<p>Key Vocabulary: Vascular, Non-vascular, tissue, roots, stems, leaves, flowers, cycads, gymnosperms, angiosperms</p>		<p>Vocabulary Activities: Matching, KaHoot, Labeling, Quizlet live</p>	
Knowledge	Reasoning	Performance Skills	Product Examples
<p>Explain the difference between vascular and nonvascular plants</p> <p>Describe the structure and function of the major parts of a plant</p>	<p>Compare the differences between cycads, gymnosperms, and angiosperms</p> <p>Compare the characteristics of the animal kingdom</p>	<p>Perform a flower dissection and label flower parts</p> <p>Conduct a seed identification and dissection</p> <p>Investigate the symmetry, anatomy and physiology of animals</p>	<p>Draw the structure of plant tissues and their functions</p>
<p>Resources:</p>			