



Course Description
Grades 9 – 12
Life Science
Florida
2016 - 2017



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Standard14: Organization And Development Of Living Organisms

Topic 1: Specialized Plant Cells

Description: [SC.912.L.14.2; SC.912.L.14.3; SC.912.L.14.7] In this unit students will learn to describe the structure and functions of specialized plant cells that aggregate to form tissues, and relate the structure of the major plant organs and tissues to physiological processes.

Instruction Module	Specialized Plant Cells: In this Instruction Module, students learn that multicellular plants are made up of several different kinds of cells that aggregate to form tissues. They learn that a plant is made up of the root system, consisting of the roots, and the shoot system, consisting of the leaves, the stem, and the flowers. They learn to identify and describe the structure and function of the cells that make up the different parts of a leaf, stem, and roots.
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Interactivity	Plant Cells: In this Interactivity, students apply their understanding of the structure and functions of different types of plant cells to identify different plant cells.
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Glossary	Specialized Plant Cells The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
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Quiz	Specialized Plant Cells
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Journals	Journal - Specialized Plant Cells
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Activities	Plant's Special Cells
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Topic 2: Specialized Animal Cells

Description: [SC.912.L.14.2; SC.912.L.14.3; SC.912.L.14.11] In this unit students will learn to describe the structure and functions of specialized animal cells that aggregate to form tissues.

Instruction Module

Specialized Animal Cells: In this Instruction Module, students learn that multicellular animals are made up of several different kinds of cells that aggregate to form tissues. They learn that all the different cells are formed from embryonic cells. They also learn about the structure and functions of the red blood cells, white blood cells, and platelets found in the blood, epithelial cells found in the skin, and of the cells found in skeletal muscles, smooth muscles, and cardiac muscles.

Interactivity

Tiny Specialists: In this interactivity, students will apply knowledge of the structure and function of specialized animal cells to identify and label diagrams of different types of animal cells.

Glossary

Specialized Animal Cells

The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

Specialized Animal Cells

Journals

Journal - Specialized Animal Cells

Activities

An Animal Cell Up Close

Topic 3: Cellular Processes

Description: [SC.912.L.14.2; SC.912.L.14.3] In this unit students will learn to describe cellular processes such as energy conversions, synthesis and transport of molecules, and maintenance of homeostasis.

Instruction Module

Cellular Processes: In this Instruction Module, students learn about the different cellular processes such as energy conversions, synthesis, and transport of molecules, and maintaining homeostasis. They learn about the different mechanisms by which molecules are transported into and out of a cell such as diffusion,



osmosis, facilitated diffusion, active transport, and vesicle mediated transport such as endocytosis and exocytosis.

Interactivity	Cell It! : In this Interactivity, students complete a Venn diagram to compare and contrast active and passive cellular transport mechanisms. They also apply their understanding of the cellular transport mechanisms to identify different transport mechanisms.
Glossary	Cellular Processes The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Cellular Processes
Journals	Cellular Processes
Activities	Cellular Processes: Homeostasis

Topic 4: Prokaryotic and Eukaryotic Cells

Description: [SC.912.L.14.3] In this unit students will learn to compare and contrast the general structures of prokaryotic and eukaryotic cells.

Instruction Module	Comparing Prokaryotic and Eukaryotic Cells: In this Instruction Module, students study the similarities and differences between prokaryotic and eukaryotic cells. They learn that one of the main differences between prokaryotic and eukaryotic cells is that eukaryotic cells have a nucleus and membrane bound organelles.
Interactivity	Identify and Classify: In this interactivity, students observe various cells and sort them into prokaryotic and eukaryotic cells based on their characteristics.
Glossary	Comparing Prokaryotic and Eukaryotic Cells The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Prokaryotic and Eukaryotic Cells



Journals Journal - Comparing Prokaryotic and Eukaryotic Cells

Activities Comparing Prokaryotic and Eukaryotic Cells

Topic 5: Cellular Evolution

Description: [SC.912.L.14.5] In this unit students will learn about the endosymbiotic theory that explains the origin of eukaryotic cells.

Instruction Module **Cellular Evolution:** In this Instruction Module, students understand that the endosymbiotic theory explains the evolution of complex eukaryotes from simple symbiotic prokaryotic communities.

Interactivity **The Endosymbiotic Theory:** In this interactivity, students label the parts of a symbiotic bacterial community and understand how the different components interact. They appropriately label the links between them.

Glossary **Cellular Evolution**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Cellular Evolution

Journals Journal - Evidence of Endosymbiotic Theory
Journal - Cellular Evolution

Activities Endosymbiotic Hypothesis and Theory
The History of Biology



Standard 15: Diversity and Evolution of Living Organisms

Topic 1: Evidence of Common Ancestry

Description: [[SC.912.L.15.1] In this unit students will learn to explain anatomical, biogeographical, embryological, and molecular evidence for common ancestry.

Instruction Module **Evidence of Common Ancestry:** In this Instruction Module, students learn that the evolutionary theory can be used to explain the relationships between organisms. They analyze and evaluate anatomical, biogeographical, embryological, and molecular evidence for common ancestry.

Interactivity **Create a Cladogram:** In this interactivity, students compare the amino acid sequences in a section of the cytochrome-c protein, of four different organisms with that of a human and construct a cladogram.

Glossary **Evidence of Common Ancestry**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Evidence of Common Ancestry

Journals
Journal - Evidence of Common Ancestry
Journal - Evidence of Common Ancestry and Biogeography

Activities
Hypothesis vs. Theory
Evidence Provided by Homologies

Topic 2: Fossils and Evolution

Description: [SC.912.L.15.1] In this unit students will learn that the theory of evolution is supported by the fossil record and analyze different scientific explanations for sudden appearance, stasis, and sequential nature of groups in existing fossil records.



Instruction Module	Fossils and Evolution: In this Instruction Module, students learn that all the fossils along with the information about the rock layers they are found in, make up the fossil record. They analyze different scientific explanations for sudden appearance, stasis and sequential nature of groups in existing fossil records.
Interactivity	Layer 'n' Record: In this interactivity, students observe and predict how different geological factors affect fossilization.
Glossary	Fossils and Evolution The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Fossils and Evolution
Journals	Fossils and Evolution Journal - The Fossil Record - Gradualism vs. Punctuated Equilibrium

Topic 3: Organisms and Natural Selection

Description: [SC.912.L.15.13] In this unit students will learn about the process of natural selection and analyze how natural selection can bring about change in a population over time.

Instruction Module	Organisms and Natural Selection: In this Instruction Module, students understand the process of natural selection. They identify traits in individuals and compare variants within a population. They observe and analyze how natural selection can bring about change in a population over time.
Simulation	Modeling Bacterial Drug Resistance: In this simulation, students model the effect of natural selection in the development of penicillin resistance in a sample bacterial population.
Glossary	Organisms and Natural Selection The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Organisms and Natural Selection



Journals Journal - Organisms and Natural Selection

Activity Drug Resistant Bacteria

Topic 4: Factors Leading to Natural Selection

Description: [SC.912.L.15.13] In this unit students will learn to identify and describe the factors that can lead to natural selection, including overproduction of offspring, genetic variation, and finite supply of resources.

Instruction Module **Factors Leading to Natural Selection:** In this Instruction Module, students understand that natural selection is a process. They identify and describe the factors that can lead to natural selection such as genetic variation in a population, finite supply of resources, and the potential of a population to produce more offspring than can survive. They also learn to describe the effects of natural selection on reproductive success.

Simulation **Food for Finches:** In this Simulation, students investigate how environmental factors such as availability of different food sources can cause natural selection to act on traits "such as beak size and shape" and change the predominant phenotypes in a population over time.

Glossary **Factors Leading to Natural Selection**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Factors Leading to Natural Selection

Journals Journal - Factors Leading to Natural Selection
Journal - Natural Selection and Reproductive Success



Topic 5: Evolutionary Mechanisms

Description: [SC.912.L.15.12; SC.912.L.15.14; SC.912.L.15.15] In this unit students will learn about the mechanisms of evolutionary change other than natural selection, such as genetic drift and gene flow, and describe the effects of mutation and recombination.

Instruction Module **Evolutionary Mechanisms:** In this Instruction Module, students analyze and evaluate the effects of evolutionary mechanisms other than natural selection such as genetic drift, gene flow, mutation, recombination and nonrandom mating.

Interactivity **What’s the Mechanism?:** In this interactivity, students observe pictures representing different evolutionary mechanisms and identify the relevant evolutionary mechanism associated with each image. They identify the evolutionary processes of gene flow, genetic drift, mutation, bottleneck, and founder effect.

Glossary **Evolutionary Mechanisms**
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Quiz Evolutionary Mechanisms

Journals Journal - Evolutionary Mechanisms

Activity Analyzing and Evaluating the Effects of Genetic Drift and recombination
Analyzing and Evaluating the Effects of Genetic Drift
Analyzing and Evaluating the Effects of Recombination

Topic 6: Biological Classification

Description: [SC.912.L.15.5] In this unit students will recognize the importance of taxonomy, and compare current taxonomic systems with earlier ones.

Instruction Module **Biological Classification:** In this Instruction Module, students are introduced to the concept of taxonomy. They compare old and current taxonomic systems, and explain why a globally standardized system is necessary and important to the scientific community.



Interactivity	Sort the Aliens: In this interactivity, students apply hierarchical classification to choose the best physical characteristics to use to sort the newly discovered organisms into groups.
Glossary	Biological Classification The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Biological Classification
Journals	Journal - Biological Classification Journal - Importance of a Standardized Taxonomic System
Activity	El Chupacabra: New Species or Just an Urban Legend?

Topic 7: Classifying Organisms

Description: [SC.912.L.15.4] In this unit students will learn how and why organisms are hierarchically classified based on evolutionary relationships.

Instruction Module	Classifying Organisms: In this Instruction Module, students learn that the hierarchical system of classification groups organisms into smaller and smaller categories based on increasing similarities in their physical characteristics. They learn that the hierarchical classification also helps to understand the evolutionary relationships between organisms. They also learn that scientists use tools called dichotomous keys to identify and classify organisms at different levels.
Interactivity	Classifi-key-tion of Organisms!: In this interactivity, students use hierarchical classification to sort organisms into smaller and smaller groups. Students also use a dichotomous key to identify the order to which four different mammals belong.
Glossary	Classifying Organisms The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.



Quiz	Classifying Organisms
Journals	Journal - Classifying Organisms
Activity	Design a Dichotomous Key

Topic 8: The Six-kingdom Classification System

Description: [SC.912.L.15.6; SC.912.L.15.7] In this unit students will learn that all organisms on Earth can be sorted into three domains, and further into six kingdoms, and compare and contrast the characteristics of domains and kingdoms of organisms.

Instruction Module

The Six-kingdom Classification System: In this Instruction Module, students learn that all organisms on Earth can be sorted into three domains and further into six kingdoms, namely Eubacteria, Archaeobacteria, Protista, Fungi, Plantae, and Animalia. They learn to compare and contrast the characteristics of organisms in these six kingdoms and also learn about the evolutionary relationships between them.

Interactivity

Tree of Life: In this interactivity, students demonstrate understanding of the organization of the three domains and six kingdoms to complete a phylogenetic tree.

Glossary

The Six Kingdom Classification System

The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

The Six Kingdom Classification System

Journals

Journal - The Six Kingdoms



Activity

What's in the Water?

Topic 9: Origin of Biomolecules

Description: [SC.912.L.15.8] In this unit students will learn about the theory of abiogenesis which can be used to explain the origin of life on Earth.

Instruction Module

Origin of Biomolecules: In this Instruction Module, students are introduced to the theory of abiogenesis, which can be used to explain the evolution of life on earth. They learn about the formation of simple organic molecules and their organization into long complex molecules, which eventually aggregate to form the first cell-like structures. They also analyze and evaluate the four postulates of the abiogenesis theory.

Interactivity

Origin of Life: In this Interactivity, students sequence the events that ultimately led to the origin of life on Earth, as postulated by the theory of abiogenesis.

Glossary

Origin of Biomolecules

The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

Origin of Biomolecules

Journals

Journal - Origin of Biomolecules
Journal - Origin of Biomolecules - Theories vs. Hypotheses

Topic 10: Natural Selection and Biological Diversity

Description: [[SC.912.L.15.2; SC.912.L.15.3; SC.912.L.15.9] In this unit students will learn to describe how natural selection can lead to the formation of new species, and explain the role of reproductive isolation in the process of speciation.

Instruction Module

Natural Selection and Biological Diversity: In this Instruction Module, students understand the relationship between natural selection and adaptation. They explain how natural selection, over



time, can lead to the formation of new species. They recognize that speciation can occur as a result of reproductive isolation of different populations.

Interactivity	Reproductive Isolation and Speciation: In this interactivity, students observe the different mechanisms of reproductive isolation and identify them. They identify the mode of speciation that occurs as a result of reproductive isolation.
Glossary	Natural Selection and Biological Diversity The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Natural Selection and Biological Diversity
Journals	Journal - Natural Selection and Biological Diversity Journal - Adaptive Radiation and Biodiversity

Standard 16: Heredity and Reproduction

Topic 1: Mendelian Genetics

Description: [SC.912.L.16.1] In this unit students will learn to use Mendel's laws of segregation and independent assortment to analyze and predict patterns of inheritance.

Instruction Module	Mendelian Monohybrid Crosses: In this Instruction Module, students understand that traits are heritable features. They study monohybrid crosses, first performed by Gregor Mendel to study the pattern of inheritance of a single trait. They also learn how to predict possible outcomes of different monohybrid crosses using Punnett squares.
Instruction Module	Mendelian Dihybrid Crosses: In this Instruction Module, students study Mendelian dihybrid crosses or crosses performed by Gregor Mendel to study the simultaneous inheritance patterns of two traits. They also learn to predict the possible outcomes of different dihybrid crosses using Punnett squares.
Interactivity	Punnett Squares: In this interactivity, students perform dihybrid crosses to investigate the pattern of inheritance of two different



	traits, simultaneously. Going Batty over Punnett Squares: In this Interactivity, students determine the genotype of a given bat specimen using the principles of Mendelian monohybrid crosses.
Glossary	Mendelian Genetics The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Mendelian Monohybrid Crosses Mendelian Dihybrid Crosses
Journals	Journal - Mendelian Dihybrid Crosses Journal - Mendelian Monohybrid Crosses
Activities	Mendelian Monohybrid and Dihybrid Crosses

Topic 2: Non-Mendelian Genetics

Description: [SC.912.L.16.2] In this unit students will learn about inheritance patterns caused by various modes of inheritance including incomplete dominance, codominance, multiple allele inheritance, gene linkage, polygenic inheritance and sex linked inheritance.

Instruction Module	Non-Mendelian Genetics: In this instruction module, students learn that there are many traits that do not follow Mendel’s laws of inheritance. They understand how and why non-Mendelian inheritance is different from Mendelian inheritance. They learn the concepts of incomplete dominance, codominance, multiple allele inheritance, gene linkage, polygenic inheritance and sex-linked inheritance.
Interactivity	Crossing-over: In this interactivity, students observe the process of crossing over that occurs during meiosis and study its effects on linked genes. Non-Mendelian Genetics
Glossary	The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Non-Mendelian Genetics



Journals Journal - Non-Mendelian

Activities Non-Mendelian Crosses

Topic 3: Molecules of Heredity

Description: [SC.912.L.16.3] In this unit students will learn that segments of DNA store genetic information and describe the structure of a DNA molecule.

Instruction Module **Molecules of Heredity:** In this Instruction Module, students learn to describe the structure of a DNA molecule. They identify the components of a DNA nucleotide. They compare and contrast the structure of an RNA molecule with that of a DNA molecule. They learn about the different experiments that established DNA as the molecule of heredity.

Interactivity **Nucleic Acids:** In this interactivity, students assume the role of genetic engineer as they apply knowledge of the components of DNA and RNA to construct DNA and RNA molecules.

Glossary **Molecules of Heredity**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Molecules of Heredity

Journals Journal - Molecules of Heredity

Activities Molecules of Heredity - DNA Research Timeline



Topic 4: DNA Replication

Description: [SC.912.L.16.3] In this unit students will learn to describe the process of DNA replication and how it relates to the transmission and conservation of genetic information.

Instruction Module **DNA Replication:** In this Instruction Module, students learn that segments of DNA, called genes, store all the information that controls the different traits of an organism. They learn how DNA is replicated and recognize the different steps of DNA replication. They also learn that DNA replication is semiconservative and that each daughter DNA molecule consists of one old strand from the parent DNA and one newly synthesized strand.

Interactivity **DNA Replication:** In this interactivity, students assume the role of genetic engineer as they apply knowledge of the components of DNA and RNA to construct DNA and RNA molecules.

Glossary **DNA Replication**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz DNA Replication

Journals Journal - DNA Replication

Topic 5: Cell Differentiation

Description: [SC.912.L.16.4] In this unit students will learn about the role of gene expression in cellular diversity and complexity in multicellular organisms, and recognize the effects if environmental factors on cell differentiation.

Instruction Module **Cell Differentiation:** In this Instruction Module, students are introduced to the role of gene expression in cellular diversity and complexity in multicellular organisms. Students also learn about the effects of environmental factors such as temperature, light, radiation, and exposure to chemicals on cell differentiation.

Simulation **Nile River Crocodiles:** In this simulation, students observe the effect of the environmental factor, temperature, on the sex determination in crocodiles. They hypothesize, observe, collect data, and arrive at a



	conclusion.
Glossary	<p>Cell Differentiation</p> <p>The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.</p>
Quiz	Cell Differentiation
Journals	Journal -miRNA and Cell Differentiation
Activity	Cell Differentiation and lincRNA

Topic 6: Mutations

Description: [SC.912.L.16.4] In this unit students will learn that mutations are nucleotide base sequence errors that can affect single or several genes, and describe the different kinds of gene and chromosomal mutations.

Instruction Module	<p>Mutations: In this Instruction Module, students learn that mutations are nucleotide base sequence errors that can affect single or several genes. They learn that mutations can either be gene mutations or chromosomal mutations. They learn to identify and describe the different kinds of gene and chromosomal mutations. They also learn about the beneficial and harmful effects of different mutations.</p>
Interactivity	<p>Mutations: In this Interactivity, students apply their understanding of the different types of mutations to identify the type of mutation shown.</p>
Glossary	<p>Mutations</p> <p>The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.</p>
Quiz	Mutations
Activity	Letter Mutations



Topic 7: Protein Synthesis

Description: [SC.912.L.16.5] In this unit student will learn to explain the process and the results of transcription and translation.

Instruction Module	Protein Synthesis: In this Instruction Module, students learn how information stored in a gene is used to make the corresponding protein. They learn that a gene is expressed when its information is transcribed onto a messenger RNA molecule. They learn that transcription and translation are the two stages in the synthesis of a polypeptide chain that is then packaged into the respective protein. They recognize the process and the purpose of transcription and translation.
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Interactivity	Transcription and Translation: Students learn how information stored in a gene is used to synthesize a protein.
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Glossary	Protein Synthesis The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
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Quiz	Protein Synthesis
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Journal	Journal - Protein Synthesis
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Activity	Protein Synthesis Concept Map
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Topic 8: Gene Expression

Description: [SC.912.L.16.6] In this unit students will learn that gene expression is a regulated process, and explain how genes are expressed in prokaryotic and eukaryotic cells.

Instruction Module	Gene Expression: In this Instruction Module, students are introduced to the concept of gene expression in which genetic
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information is used to synthesize proteins, and recognize that gene expression is a regulated process. They also learn how genes are expressed in prokaryotic and eukaryotic cells.

Simulation	Switch On/ Switch Off: In this simulation, students add different types of nutrient solutions, representing different types of food, to E.coli bacterial cultures and predict how this change in the bacteria's environment will affect expression of the lactose and typtophan operons in the bacterial cells.
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Glossary	Gene Expression The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
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Quiz	Gene Expression
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Journal	Journal - Gene Expression
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Topic 9: The Universal Genetic Code

Description: [SC.912.L.16.9] In this unit students will learn that the genetic code is universal and is common to almost all organisms.

Instruction Module	The Universal Genetic Code: In this Instruction Module, students learn that the genetic code is nearly universal in the biological world. They also learn how this universality can be used for agricultural, industrial, and medical benefits.
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Simulation	Help the Hospital!: This simulation guides students through the key steps in recombinant DNA technology. It emphasizes the universality of the genetic code and how it can be exploited to manufacture insulin for diabetic patients.
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Glossary	The Universal Genetic Code The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
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Quiz	The Universal Genetic Code
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Journal	Journal -Universal Genetic Code Journal -Universal Genetic Code Lab Simulation
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Activity

Drawing Inferences from Promotional Materials for Services

Topic 10: Applied Genetics

Description: [SC.912.L.16.11; SC.912.L.16.12] In this unit, students will learn about technologies associated with DNA fingerprinting, including gel electrophoresis and Southern blotting, and describe some recombinant DNA techniques and their uses.

Instruction Module

Applied Genetics: In this Instruction Module, students are introduced to methods and uses of DNA fingerprinting, including gel electrophoresis and Southern blotting. Students understand how a karyotype is used to classify and compare chromosomes. They describe some recombinant DNA techniques and explain how they are used.

Interactivity

Whodunit?: In this interactivity, students sequence the different steps in DNA fingerprinting in order to narrow down the perpetrator of a hypothetical crime.

Glossary

Applied Genetics

The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

Applied Genetics

Journal

Journal -Applied Genetics

Topic 11: Viruses

Description: [SC.912.L.16.7] In this unit students will learn to compare the structures of viruses to cells, describe viral reproduction and the role of viruses in causing diseases, and describe the beneficial uses of viruses in gene therapy.

Instruction Module

Viruses: In this Instruction Module, students learn why viruses are considered nonliving. They compare and contrast viruses to prokaryotic and eukaryotic cells. They also learn about the two types of viral reproductive cycles—the lytic and the lysogenic cycles. They understand how viruses cause diseases such as influenza and AIDS and the beneficial uses of viruses in gene therapy.



Interactivity	The Virus Attack: In this interactivity, students complete a schematic representing the lytic reproductive cycle of a virus to test their understanding of the different stages of the lytic cycle.
Glossary	Viruses The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Viruses
Journal	Journal – Viruses
Activity	Viruses Making News

Topic 12: The Cell Cycle

Description: [SC.912.L.16.14; SC.912.L.16.15] In this unit students will learn to describe the stages of the cell cycle, including DNA replication and mitosis, and the importance of the cell cycle to the growth of organisms.

Instruction Module	Cell Cycle: In this Instruction Module, students are introduced to the different phases of the cell cycle including the G1, S, and G2 phases of interphase and the four stages of mitosis—prophase, metaphase, anaphase, and telophase.
Simulation	Onion 'Cry'sis: In this Simulation, students perform a virtual microscopy lab activity. They follow the scientific process to observe and identify onion root tip cells in different stages of the cell cycle.
Glossary	The Cell Cycle The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	The Cell Cycle
Journal	Journal - Cell Cycle Journal - Evaluating Models



Activity

Describing Stages of the Cell Cycle

Topic 13: Disruptions in the Cell Cycle

Description: [SC.912.L.16.8] In this unit students will learn about the importance of the different phases of the cell cycle, and recognize that uncontrolled cell growth can result in cancer.

Instruction Module

Disruptions in the Cell Cycle: In this Instruction Module, students learn about the importance of the different phases of the cell cycle of eukaryotic cells. They are introduced to the major checkpoints and proteins that regulate the cell cycle. They also identify the consequences of defects in the cell cycle.

Interactivity

Disruptions in the Cell Cycle: In this interactivity, students sequence the different steps that lead to the development of cancer.

Glossary

Disruptions in the Cell Cycle
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

Disruptions in the Cell Cycle

Journal

Journal - Disruptions in the Cell Cycle

Activity

Disruptions in the Cell Cycle - Selecting the Best Sunscreen

Topic 14: Meiosis

Description: [SC.912.L.16.16] In this unit students will learn to describe the process of meiosis and recognize the significance of meiosis and sexual reproduction in increasing genetic variation.

Instruction Module

Meiosis: In this Instruction Module, students learn that meiosis results in the formation of sex cells or gametes, involved in sexual reproduction. They learn to describe the different stages of meiosis and recognize the significance of meiosis and sexual reproduction in increasing genetic variation.



Interactivity	Phase Off!: In this interactivity, students apply their understanding of meiosis to identify the different stages of meiosis.
Glossary	Meiosis The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Meiosis
Journal	Journal - Meiosis

Standard 17: Interdependence

Topic 1: Ecological Succession

Description: [SC.912.L.17.4] In this unit students will learn to describe changes in ecosystems resulting from succession.

Instruction Module	Ecological Succession: In this Instruction Module, students are introduced to the key concepts of ecological succession, namely, primary succession, secondary succession, and climax community. They understand and describe how primary and secondary succession can alter ecosystems.
Interactivity	What Came First?: In this interactivity, students choose different species in sequence to illustrate the correct order of succession following an ecological disaster.
Glossary	Ecological Succession The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Ecological Succession
Journals	Journal - Ecological Succession



Topic 2: Population and Community Ecology

Description: [SC.912.L.17.5] In this unit students will learn to analyze how population sizes are limited by different abiotic and biotic factors.

Instruction Module **Population and Community Ecology:** In this Instruction Module, students analyze and evaluate how population sizes are limited by different abiotic and biotic factors.

Simulation **Pond Watch:** In this simulation, students observe, identify and record the effects of abiotic and biotic limiting factors on populations of organisms in a pond habitat.

Glossary **Population and Community Ecology**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Population and Community Ecology

Journals Journal - Population and Community Ecology

Topic 3: Resources and Survival

Description: [SC.912.L.17.5; SC.912.L.17.8] In this unit students will learn about limiting factors that determine carrying capacity, and analyze and evaluate how human activity can cause changes in ecosystems and impact biotic and abiotic resources.

Instruction Module **Resources and Survival:** In this Instruction Module, students learn about limiting factors or resources that are scarce, and understand how limiting factors affect population sizes of organisms in different ecosystems. They also learn to analyze and evaluate how human activity can cause changes in ecosystems and impact biotic and abiotic resources.



Interactivity	Pesticide Pond: In this interactivity, students apply knowledge of factors that affect population size to identify how the introduction of a pesticide will affect the population sizes of organisms in a pond ecosystem.
Glossary	Resources and Survival The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Resources and Survival
Journals	Journal 1 - Resources and Survival Journal 2 - Resources and Survival

Topic 4: Interdependence among Organisms

Description: [SC.912.L.17.6] In this unit students will learn to compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.

Instruction Module	Interdependence among Organisms: In this Instruction Module, students learn that organisms interact with one another for various resources. They learn that interactions between two organisms in an ecosystem can either be competitive or symbiotic. They learn that symbiotic interactions include commensalism, mutualism and parasitism. They also learn to identify which organism is benefited, harmed, or remain unaffected in each type of interaction.
Interactivity	Interactions: In this interactivity, students identify different types of interactions between organisms and how the interaction affects each organism.
Glossary	Interdependence Among Organisms The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Interdependence Among Organisms
Journals	Journal - Interdependence Among Organisms



Topic 5: Energy Flow in the Living World

Description: [SC.912.L.17.9] In this unit students will learn to use a food web to identify and distinguish producers, consumers, and decomposers, and explain the flow of energy through trophic levels using an energy pyramid.

Instruction Module **Energy Flow in the Living World:** In this Instruction Module, students learn that organisms in an ecosystem depend on each other for nutrients and energy. They analyze and evaluate the energy relationships between different organisms in an ecosystem using food chains, food webs, and energy pyramids. They also learn that although matter can be recycled between the different components of an ecosystem, the flow of energy is unidirectional.

Interactivity **Marine Energy Pyramid:** In this Interactivity, students identify the different levels of an energy pyramid for a marine ecosystem. They also identify the organisms that occupy each level in the energy pyramid, from a given list of organisms.

Glossary **Energy Flow in the Living World**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Energy Flow in the Living World

Journals Journal - Energy Flow in the Living World

Activity Energy Pyramid

Topic 6: Nutrient Cycling in the Environment

Description: [SC.912.L.17.10] In this unit students will learn the importance of nutrient cycling, and explain the carbon and nitrogen cycles.



Instruction Module	Nutrient Cycling in the Environment: In this Instruction Module, students understand the importance of nutrient cycling. They learn about the nitrogen and carbon cycles, which describe how nutrients such as nitrogen and carbon are cycled through the environment. They learn to explain the consequences of disrupting these cycles.
Interactivity	The Nitrogen Cycle: In this interactivity, students identify the factors and organisms responsible for each stage of the nitrogen cycle.
Glossary	Nutrient Cycling in the Environment The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.
Quiz	Nutrient Cycling in the Environment
Journals	Journal - Nutrient Cycling in the Environment
Activity	Nutrient Cycling and the Environment

Topic 7: Ecological Balance

Description: [SC.912.L.17.8; SC.912.L.17.16; SC.912.L.17.20] In this unit students will learn about ecological balance and describe how environmental changes can affect ecosystem stability.

Instruction Module	Ecological Balance: In this Instruction Module, students understand how the interactions between biotic and abiotic components can lead to stability within an ecosystem. They describe how environmental changes can affect ecosystem stability.
Interactivity	The Water Works! In this interactivity, students identify the ecological impacts of different types of water resource facilities.
Glossary	Ecological Balance The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.



Quiz	Ecological Balance
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Journals Journal - Ecological Balance

Standard 18: Matter and Energy Transformations

Topic 1: Biomolecules

Description: [SC.912.L.18.1; SC.912.L.18.2; SC.912.L.18.3; SC.912.L.18.4] In this unit students will learn to describe the structure and functions of biomolecules namely, proteins, carbohydrates, lipids, and nucleic acids.

Instruction Module **Biomolecules:** In this Instruction Module, students learn that biomolecules are large molecules synthesized by living things. They learn that there are four classes of biomolecules, namely proteins, carbohydrates, lipids, and nucleic acids. They learn about the structure and functions of these biomolecules and learn to compare and contrast their structures and functions.

Interactivity **Biomolecules on My Table:** In this Interactivity, students apply their understanding of biomolecules to identify the kinds of biomolecules present in different foods.

Glossary **Biomolecules**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz	Biomolecules
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Journals Journal 1 - Biomolecules

Activities	BioMatch
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Topic 2: Photosynthesis and Cellular Respiration

Description: [SC.912.L.18.5; SC.912.L.18.6; SC.912.L.18.7; SC.912.L.18.8; SC.912.L.18.9; SC.912.L.18.10] In this unit students will learn to identify the reactants, products, and basic functions of photosynthesis and cellular respiration, and describe the different steps in these processes.

Instruction Module **Photosynthesis and Cellular Respiration:** In this Instruction Module, students learn that photosynthesis and cellular respiration are complex and important life processes. They learn about the different steps in these processes and compare them in terms of their reactants, products, and energy usage.

Interactivity **Photosynthesis and Cellular Respiration:** In this interactivity, students label a schematic diagram to show the relationship between the processes of photosynthesis and cellular respiration.

Glossary **Photosynthesis and Cellular Respiration**
The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz Photosynthesis and Cellular Respiration

Journals Journal - Photosynthesis and Cellular Respiration

Topic 3: Enzymes

Description: [SC.912.L.18.11] In this unit students will learn that enzymes are biological catalysts that speed up biochemical reactions and identify factors, such as pH and temperature, and their effect on enzyme activity.

Instruction Module **Enzymes:** In this Instruction Module, students learn that enzymes are biological catalysts that speed up biochemical reactions. They learn how enzymes work to speed up reactions. They also learn to analyze and evaluate the effects of different environmental factors such as temperature and pH, and of chemicals such as cofactors and inhibitors, on enzyme activity.

Interactivity **EnzyMatix:** In this Interactivity, students apply their understanding of how enzymes work to identify components of different enzyme catalyzed reactions.



Glossary

Enzymes

The interactive multimedia glossary provides both linguistic and non-linguistic representations of key terms related to science concepts presented in the Instruction Modules, Interactivities, and Simulations.

Quiz

Enzymes

Journals

Journal 1 - Enzymes