Biology Instructional Toolkit

The Biology Instructional Focus Toolkit has been created to assist teachers with planning instruction. This toolkit is not intended to replace your district's curriculum, but rather to enhance understanding of the standards, support instruction with resources that are well aligned to the benchmarks and to clarify how the information will be assessed on the Biology End-of Course Assessment.

The biology content can be broken down into three major reporting categories as assessed on the Biology EOC with a corresponding weight. For organizational purposes each reporting category can be further broken down into units.

Molecular and Cell Biology (35%)

- Unit 1: Macromolecules
- Unit 2: Properties of Water
- Unit 3: Cell Theory
- Unit 4: Cell Structure and Function
- Unit 5: Cell Energy

Classification, Heredity and Evolution (25%)

- Unit 6: Genetics
- Unit 7: Natural Selection
- Unit 8: Evolution
- Unit 9: Classification

Organisms, Populations and Ecosystems (40%)

- Unit 10: Ecology
- Unit 11: Plants
- Unit 12: Human Systems

Within each of these units, there are essential "keystone" standards that help build the unit and provide the foundation for development of the content. These keystone standards are annually assessed and often contain additional supportive standards beneath them (indicated as "also assesses" on the assessment documents). For example, N.1.1 also assesses N.1.4, N.1.6 and L.14.4. This information is also provided in the Test Item Specifications for biology (http://www.fldoe.org/core/fileparse.php/5662/urlt/0077547-biologyfl11sp.pdf) and within the toolkit unit resources below. The twelve units and their corresponding keystone standards may be enhanced with hands-on inquiry opportunities, text resources, Model Eliciting Activities (MEAs), animations and tutorials. The activities provided below have been selected to enhance these units and keystone standards.

Model Eliciting Activities (MEAs) are open-ended, interdisciplinary, problem solving activities closely aligned with the standards. CPALMS has integrated these activities into the lesson resources available to educators. In a MEA lesson, teachers act as a facilitator as student teams work to solve a problem. For more information about MEA construction and implementation please visit mea.cpalms.org.

To assist students with achieving the proper level of complexity in their content development, the activities below have been selected to provide opportunities for moderate and high levels of thinking. Complexity levels and percentage of questions in each of the complexity levels is provided in the test item specifications (http://www.fldoe.org/core/fileparse.php/5662/urlt/0077547-biologyfl11sp.pdf). Please note that on the end of course assessment over 80 percent of all standards are assessed at the levels of moderate to high.

These twelve units with corresponding classroom activities may be used as a basic foundation for classroom investigations fully aligned to the standards. Each of these activities are pulled from CPALMS (http://www.cpalms.org/Public/). A full list of the course standards may be found within the Biology Course Description (http://www.cpalms.org/Public/PreviewCourse/Preview/13083). The unit resources listed below represent a small sample of those available on CPALMS. In order to review the additional resources available simply click on the standard links. The resources will be accessible on the right side of the standard page.

A study tool for students can be found at http://www.floridastudents.org/. Florida Students is an interactive site that provides educational resources aligned closely with the biology standards. Students have access to the resources with no need of a user name and password. The introduction video on the home page explains in a simple manner how students and parents can utilize the website. For parents, it will take the mystery out of how to support their child when studying biology content. Educators can have confidence that the support received on this site is aligned with the standards.

Units and Supportive Activities

Unit 1: Macromolecules

SC.912.L.18.1

Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.

Annually assessed on Biology EOC. Also assesses **SC.912.L.18.11**.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of **SC.6.L.14.3** **and** **SC.8.P.8.5**.

Reporting Category: Molecular and Cellular Biology

Students will:

- Identify and/or describe the basic molecular structure of carbohydrates, lipids, proteins, and/or nucleic acids.
- Describe the primary functions of carbohydrates, lipids, proteins and/or nucleic acids in organisms.
- Explain how enzymes speed up the rate of a biochemical reaction by lowering the reaction's activation energy.
- Identify and/or describe the effect of environmental factors on enzyme activity.

Resources:

Macromolecule Food Indicator Lab

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/45864

In this lesson students will complete a lab using indicators to determine which foods contain carbohydrates, lipids, proteins and/or starches. The lab includes pre-lab questions, discussion, lab experimentation, post lab questions, results and conclusion. The students will submit a completed lab report that will be graded based upon a rubric.

Who Took Jerell's iPod? -- An Organic Compound Mystery (Lab)

http://serendip.brynmawr.edu/exchange/waldron/organic

Students use their knowledge of organic compounds to solve a simulated mystery (Who took Jerell's iPod) by testing for triglycerides, glucose, starch and protein. This lab deepens student understanding of biological functions and food sources of various organic compounds.

> Please note: For the two labs above brown paper grocery bags or brown lunch bags work well for the lipid tests. Glucose test strips or Benedict's solution can be used as an indicator for the presence of a sugar. The indicator for the presence of a starch is iodine. Biuret Solution is the indicator solution for the presence of protein.

Macromolecule Snack Attack (STEM Lessons - Model Eliciting Activity)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/64872

In this MEA, students will be introduced to the four biological macromolecules through common snack foods found in vending machines. They will act as dietitians selecting and ranking snack foods based on given their nutrition labels and knowledge of the structure and function of the four biological macromolecules.

Video: Macromolecules (Updated)

https://www.youtube.com/watch?v=YO244P1e9QM

This video includes examples of each of the four macromolecules along with a pneumonic device for recalling the elements that each macromolecule is made of. "Cho-Cho-Chon-Chonp" (Carbon-Hydrogen-Oxygen-Nitrogen-Phosphorus) Students should have a sheet of paper out when viewing to follow the directions as given for recording this device.

Accompanying recap handout available at:
http://www.amoebasisters.com/uploads/2/1/9/0/21902384/video_recap_of_biomolecules_v.2_by_amoeba_sisters.pdf.

Video: Enzymes: The Proteins that Remind Us of Pac-Man

https://www.youtube.com/watch?v=qgVFkRn8f10

The Amoeba Sisters explain enzymes and how they interact with their substrates using an analogy with the game Pac-Man. Vocabulary covered includes active site, induced fit, coenzyme and cofactor. Also the importance of ideal pH and temperatures for enzymes are discussed.

Accompanying recap handout available at:
http://www.amoebasisters.com/uploads/2/1/9/0/21902384/video_recap_of_enzymes_by_amoeba_sisters.pdf.

Interactive Website: Molecular Structure of Fat

http://www.hhmi.org/biointeractive/molecular-structure-fat

"Fat" is a word that has several meanings in biology. Fat is a type of tissue. It can also refer to a cell type and to a class of molecules. This slide show delves into the various molecular shapes that fat can take.

Interactive Website: Small Molecule Diversity

http://www.hhmi.org/biointeractive/small-molecule-diversity

Small molecules are chemicals that can interact with proteins to affect their functions. Learn about the structure and biological functions of various small molecules like sugar and caffeine.

Unit 2: Properties of Water

SC.912.L.18.12

Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing and versatility as a solvent.

Annually assessed on Biology EOC.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.E.7.4 and SC.8.P.8.5.

Reporting Category: Molecular and Cellular Biology

Students will:

- Explain the properties of water at a conceptual level.
- Explain why the properties make water essential for life on Earth.

Resources:

The Seven Major Properties of Water (Lab)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/40107

The goal of this lesson is that students will be able to conduct mini-experiments that demonstrate how water behaves. Students will perform the experiment, collect the data, diagram results and generate a definition of the seven properties of water.

Water and Life (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/41637

Paul Anderson begins with a brief description of NASA discoveries related to Mars, Mercury and water. He then explains why water is required for life. He finally uses a simulation to show why water acts as a wonderful solvent and provides a medium for metabolism.

Life's Little Essential (Text Resource)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/57409

This informational text resource is intended to support reading in the content area. The article explains why water is so essential and the properties of water that make it critical for life on Earth.

How Polarity Makes Water Behave Strangely (Tutorial)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/118441

Water is both essential and unique. Many of its particular qualities stem from the fact that it consists of two hydrogen atoms and one oxygen, therefore creating an unequal sharing of electrons. From fish in frozen lakes to ice floating on water, Christina Kleinberg describes the effects of polarity.

Unit 3: Cell Theory

SC.912.L.14.1

Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.14.2, SC.8.E.5.10, SC.6.N.2.1, SC.6.N.2.2, SC.6.N.3.1, SC.6.N.3.2, SC.6.N.3.3, SC.7.N.1.7, SC.7.N.2.1, SC.7.N.3.1, SC.8.N.1.5, SC.8.N.2.1, SC.8.N.2.2 and SC.8.N.3.2.

Reporting Category: Molecular and Cellular Biology

Students will:

- Describe and/or explain the cell theory.
- Describe how continuous investigations and/or new scientific information influenced the development of the cell theory.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and consideration of alternative explanations).
- Identify what is science, what is not science and what resembles but fails to meet the criteria for science.
- Explain the development of a theory.
- Recognize the differences between theories and laws.

Resources:

Cells Are Alive!

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/130355

This lesson plan guides the student to examine the reasoning behind each of the tenets of the cell theory. Students will explore the formulation of cell theory and why this fundamental principle is important to biology by watching a video, conducting their own research and discussing ideas with their peers.

The Cell Theory Sharing Book

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/131524

In this lesson, students will create a picture book about the cell theory to be shared with middle school students who are learning about this topic and to demonstrate the relationship between the development and the process of science.

Cells, Cells Everywhere! (Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/115502

By the end of this tutorial students will be able to support the basic principles of the cell theory. The cell theory states that all organisms are made of cells. Cells are the smallest and most basic unit of life. And finally, cells can only come from other cells.

Sorting Cells (Perspectives Video: Expert)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/128572

Flow Cytometry is a cool technology that can count and sort cells. Ruth Didier, Director of the Flow Cytometry and Confocal Microscopy Facility in the Biomedical Sciences Department at the Florida State University College of Medicine explains flow cytometry and her work with cells.

Unit 4: Cell Structure and Function

SC.912.L.14.3

Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.

Annually assessed on Biology EOC. Also assesses **SC.912.L.14.2.**

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of **SC.6.L.14.3 and SC.6.L.14.4.**

Reporting Category: Molecular and Cellular Biology

Students will:

- Compare and/or contrast the structures found in plant cells and in animal cells.
- Compare and/or contrast the structures found in prokaryotic cells and in eukaryotic cells.
- Describe how structures in cells are directly related to their function in the cell.
- Explain the role of the cell membrane during active and passive transport.

Resources:

Touring the Cell (Lab)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/127175

In this lesson the students will provide detailed explanations of cell structures and their functions, produce an artifact that highlights how prokaryote and eukaryote cells differ, how plant and animal cells differ and how structure relates to function. Students will also design and conduct a lab exploring cells and/or their structures.

This lab also addresses: **SC.912.N.1.1**

Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics and earth/space science.

Spirillum, Dandelions and Koalas, OH MY! (This lesson is a STEM project-based learning opportunity.)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/149143

This lesson allows students to create a science center display showing their knowledge of the general structures of prokaryotic and eukaryotic cells and the structures and functions for the components of plant and animal cells. At the end of this lesson, students will be assessed by participating in a gallery walk that displays their design for a local science center.

Cell Structure

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/130132

This lesson will teach the cell structures of both prokaryotic and eukaryotic cells.

A Tour of the Cell (Video Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/41646

Paul Anderson takes you on a tour of the cell. He starts by explaining the difference between prokaryotic and eukaryotic cells. He also explains why cells are small but not infinitely small. He also explains how the organelles work together in a similar fashion.

Cells Alive (Website)

http://www.cellsalive.com/

This site provides students with the opportunity to explore, study and play with cells, microbes and the immune system. A detailed animation entitled "The Inner Life of Cell" takes students on a tour of the structure and function of cells. To access this resource from the Cells Alive website, click on "Plant/Animal" under Interactive Cell Models. The site also includes links to study tools and readings. A cellular glossary is provided.

Prokaryotes, Eukaryotes, & Viruses Tutorial (Review/Study Tool)

http://www.biology.arizona.edu/cell_bio/tutorials/pev/main.html

This is predominantly a text resource that provides accurate, straight-forward descriptions of prokaryotes, eukaryotes and viruses. It could be a great tool to help students compare and contrast organisms with each other and viruses, or a good review passage.

Semipermeable Cell Membrane Inquiry (Perspectives Video: Teaching Idea)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/LivePreview/128335

Let this semipermeable membrane teaching idea sink in.

Unit 5: Cell Energy

SC.912.L.18.9

Explain the interrelated nature of photosynthesis and cellular respiration.

Annually assessed on Biology EOC. Also assesses SC.912.L.18.7; SC.912.L.18.8; SC.912.L.18.10.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.14.4, SC.8.L.18.1, SC.8.L.18.2, SC.7.P.11.2 and SC.7.P.11.3.

Reporting Category: Molecular and Cellular Biology

Students will:

- Explain how the products of photosynthesis are used as reactants for cellular respiration and vice versa.
- Explain how photosynthesis stores energy and cellular respiration releases energy.
- Identify the reactants, products and/or the basic function of photosynthesis.
- Identify the reactants, products and/or the basic functions of aerobic and anaerobic cellular respiration.
- Connect the role of adenosine triphosphate (ATP) to energy transfers within the cell.

Resources:

Just Breathe! (Lab)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/75792

Students will complete an experimental lab setup using snails and elodea in test tubes placed in light and dark conditions to test the outcomes.

It's a Small World (Lab)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/76047

Students will create a closed system and investigate the effects of organisms on the pH of the closed system to examine the interrelated nature of photosynthesis and cellular respiration.

Corn Conundrum (STEM Lessons – Model Eliciting Activity)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/32177

The Corn Conundrum MEA provides students with an agricultural problem in which they must work as a team to develop a procedure to select the best variety of corn to grow under drier conditions predicted by models of global climate change. Students must determine the most important factors that make planting crops sustainable in restricted climate conditions for the client. The main focus of this MEA is manipulating factors relating to plant biology, including transpiration and photosynthesis.

Cellular Respiration (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/28998

These animations show cell respiration as a big picture and then go through the steps of cellular respiration: glycolysis, the Krebs cycle and electron transport. Each animation is short and to the point.

ATP Synthesis during Photosynthesis (Tutorial)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/121633

Photosynthesis is often described as the reverse of cellular respiration. Respiration breaks down complex molecules to release energy that is used to make ATP. Photosynthesis takes energy from photons and uses it to build complex molecules. However both systems use an electron transport chain and associated proton pump and ATP synthase as a key part of the process. This tutorial will help you to understand the electron transport chain and ATP synthesis.

Unit 6: Genetics

SC.912.L.16.1

Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.

Annually assessed on Biology EOC. Also assesses SC.912.L.16.2.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.7.L.16.1 and SC.7.L.16.2.

Reporting Category: Classification, Heredity and Evolution

Students will:

- Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
- Identify, analyze and/or predict inheritance patterns caused by various modes of inheritance.

SC.912.L.16.2

Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic and multiple alleles.

SC.912.L.16.3

Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.

SC.912.L.16.17

Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.

SC.912.L.16.10

Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.

Resources:

"DNA: Breaking the Code!"

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/75807

In this lesson, students learn about DNA, the building block of genetic material. Students learn the basic components of DNA and see how they fit together. The teacher will offer activities and support to meet these goals. The goal of this lesson is to familiarize students to the cell and it's DNA as the genetic material that manages how the cell will function. It is recommended to teach this lesson before teaching heredity is the passage of these instructions from one generation to another.

Mendelian Genetics

http://www.cpalms.org/Public/PreviewResourceUpload/Preview/38325

A full lesson plan on teaching Mendelian Genetics and how to use and understand Punnett squares.

Mendelian Genetics - Dihybrid Crosses

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/128763

This lesson allows for students to solve dihybrid crosses by applying their knowledge of Mendelian genetics. Students should already be familiar with monohybrid crosses prior to attempting this lesson.

Dragon Genetics

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/29008

In this lab, Dragon Genetics: Principles of Mendelian Genetics, students learn the principles of Mendelian genetics by using Popsicle sticks, each of which represents a pair of homologous chromosomes with multiple genetic traits. Pairs of students use their sets of Popsicle sticks to represent a mating and then identify the genetic makeup and phenotypic traits of the resulting baby dragon.

Genetics, Genetics and More Genetics

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/155648

Students will use appropriate tools (Punnett squares) and techniques to gather, analyze and interpret data. Students will explore various modes of inheritance through a hands-on activity creating offspring of a fictitious organism. Students will complete Punnett Squares for various genetic crosses and analyze and interpret the results of those crosses. Students will be able to predict the genotype and phenotype of P1 and F1 generations using Punnett Squares. Students will be able to identify complex patterns of inheritance such as co-dominance and incomplete dominance.

Got Bull? (Model Eliciting Activity)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/67421

This MEA is a genetics based lesson for upper level biology students. Students will review the data on several bulls and help a client choose the best bulls to begin a new cattle operation.

Mendelian Inheritance (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/53266

This interactive video provides a historical background about Gregor Mendel, the father of genetics, lists the rules of inheritance and contains an interactive activity for making a pedigree.

Genetics (Virtual Manipulative)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/85062

This tutorial explores the work of Gregor Mendel and his foundational genetics experiments with pea plants. It provides practice opportunities to check your understanding of inheritance patterns including single gene recessive traits and sex linked traits. The tutorial also covers more complex patterns of inheritance such those resulting from multiple alleles. Note: This resource is part of a larger collection of information regarding genetics. Users may view information before and after the specific genetics components highlighted here.

Mitosis and Meiosis Pipe Cleaner Simulation: Crossing Over and Independent Assortment

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/63364

This lesson requires the students to simulate the movement of chromosomes during mitosis and meiosis using different-colored pipe cleaners. The pipe cleaners allow the instructor to highlight both recombination (crossing over) and independent assortment, two important components of meiotic cell division. The processes that create variation among gametes are also emphasized.

This lesson plan includes excellent teacher support in the form of videos that explain how the pipe cleaners should be manipulated to demonstrate the concepts of mitosis, meiosis and independent assortment.

The Making of a Marvel: Part 3

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/156881

This lesson emphasizes the phases of meiosis and how it is different from mitosis. Students will model each phase using candy worms as chromosomes and other types of candy to represent other cellular structures. This gives students a hands on perspective of meiosis, allowing them to better grasp the differences in phases, as well as to understand the importance of meiosis in sexual reproduction.

Bioengineered Foods

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/50279

In this lesson, students compare the processes of selective breeding and transgenic manipulation of plants. They consider the pros and cons of growing genetically modified crops. They explore the possible future consequences of genetically modified organisms. Finally, they analyze public opinion data about the use of genetically modified foods.

Cleaning Up Your Act (Model Eliciting Activity)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/31745

Cleaning up Your Act Model Eliciting Activity (MEA) provides students with a real world engineering problem in which they must work as a team to design a procedure to select the best material for cleaning up an oil spill. The main focus of this MEA is to recognize the consequences of a catastrophic event and understand the environmental and economic impact based on data analysis. Students will conduct individual and team investigations in order to arrive at a scientifically sound solution to the problem.

Unit 7: Natural Selection

Natural Selection

SC.912.L.15.13

Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation and the struggle to survive, which result in differential reproductive success.

Annually assessed on Biology EOC. Also assesses SC.912.L.15.14, SC.912.L.15.15 and SC.912.N.1.3.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.7.L.15.2, SC.7.L.15.3, SC.7.L.16.1, SC.7.L.16.3, SC.7.L.17.3, SC.7.N.1.7, SC.6.N.2.2 and SC.7.N.2.1.

Reporting Category: Classification, Heredity and Evolution

Students will:

- Explain and/or describe the conditions required for natural selection that result in differential reproductive success.
- Explain and/or describe the scientific mechanisms, such as genetic drift, gene flow and nonrandom mating, resulting in evolutionary change.
- Explain and/or describe how mutation and genetic recombination increase genetic variation.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and consideration of alternative explanations).

Resources:

Evolution by Natural Selection

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/19129

Principles of natural selection are demonstrated by a simulation involving different color pompoms on different color and texture habitats and student "hunters" equipped with different types of feeding implements. Students learn how different adaptations contribute to differences in survival and reproductive success, which results in changing frequencies of genotypes in the populations.

Is Natural Selection Random?

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/127775

Students will use the real-world example of Hurricane Opal wiping out the beach mouse population from Shell Island in 1995. Students will identify the environmental pressures that led to the differentiation of the Choctawhatchee beach mouse from the mainland population (St. Andrew beach mouse) as natural selection. They will examine the beach mouse population on this island immediately following the hurricane as an example of genetic drift and the re-population of the island as gene flow. Students will then track changes in the population from the initial re-population following the hurricane to the current population and relate this to natural selection.

Honeybee vs Giant Hornet: Survival of the Fittest (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/85559

Wild Chronicles heads to Japan where a heated war between honeybees and giant hornets is being fought to the death. Armed by evolution, which species can ensure its own survival?

Modeling Bird Beaks for Natural Selection (Teaching Idea)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/126968

Pick up a new idea about how to teach concepts related to natural selection using a fun and interactive game. This activity will lead to a class discussion about the mechanisms of natural selection. It will also identify misconceptions about natural vs. artificial selection and allow students to correct them on their own.

Natural Selection (Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/121005

By the end of this tutorial you should be able to describe the conditions required for natural selection and tell how it can result in changes in species over time. Follow Charles Darwin through a life of exploration, observation and experimentation to see how he developed his ideas.

Unit 8: Evolution

SC.912.L.15.1

Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology and observed evolutionary change.

Annually Assessed on Biology EOC. Also assesses SC.912.L.15.10, SC.912.N.1.3, SC.912.N.1.4, SC.912.N.1.6, SC.912.N.2.1, SC.912.N.3.1 and SC.912.N.3.4.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.7.L.15.1, SC.7.L.15.2, SC.7.L.15.3, SC.8.E.5.10, SC.6.N.2.1, SC.6.N.2.2, SC.6.N.3.1, SC.6.N.3.2, SC.6.N.3.3, SC.7.N.1.6, SC.7.N.1.7, SC.7.N.2.1, SC.7.N.3.1, SC.8.N.1.6, SC.8.N.2.1, SC.8.N.2.2 and SC.8.N.3.2.

Reporting Category: Classification, Heredity and Evolution

Students will:

- Identify evidence and/or explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology and observable evolutionary change.
- Identify examples of and basic trends in hominid evolution from early ancestors to modern humans.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and consideration of alternative explanations).
- Assess the reliability of sources of information according to scientific standards.
- Describe how scientific inferences are made from observations and identify examples from biology.
- Identify what is science, what is not science and what resembles but fails to meet the criteria for science.
- Explain the development of a theory.
- Recognize the differences between theories and laws.

SC.912.L.15.8

Describe the scientific explanations of the origin of life on Earth.

Annually assessed on Biology EOC. Also assesses SC.912.N.1.3, SC.912.N.1.4 and SC.912.N.2.1.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.8.L.18.1, SC.7.E.6.3, SC.7.E.6.4, SC.6.E.7.9, SC.6.N.2.1, SC.6.N.2.2, SC.7.N.1.7, SC.7.N.2.1, SC.8.N.2.1 and SC.8.N.2.2.

Reporting Category: Classification, Heredity and Evolution

Students will:

- Describe scientific explanations of the origin of life on Earth.
- Identify situations or conditions contributing to the origin of life on Earth.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and consideration of alternative explanations).
- Assess the reliability of sources of information according to scientific standards.
- Identify what is science, what is not science and what resembles but fails to meet the criteria for science.

Resources:

Ancient DNA Gives Clues to Dog Evolution

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/157573

In this lesson, students will analyze an informational text that addresses the genetic analysis of a 4,800-year-old dog found in a tomb in Ireland and how this information gives rise to a new hypothesis that dogs may have been domesticated at least twice, once in East Asia and also in Europe. This lesson is designed to support reading in the content area. The lesson plan includes a note-taking guide, text-dependent questions, a writing prompt, answer keys and a writing rubric.

Bird Brains - Evolutionary Relationships

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/5381

Students will compare the sequence of amino acids in a gene shared between humans and six other organisms and infer evolutionary relationships among the species.

Becoming Whales

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/371

Students will experience the historical discovery of fossils that increasingly link whales to earlier land-dwelling mammals. This experience reveals how scientists can make predictions about past events, based on the theory and evidence that whales evolved. This lesson also provides confirmation, with multiple independent lines of evidence, that there is a series of intermediate forms, showing gradual accumulation of changes, linking certain terrestrial mammal groups with modern whales.

The Times They Are a Changing

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/121840

Students will combine their knowledge of the effects of climate change on ecosystems with trends in hominid evolution to predict future changes in hominid evolution.

Evolution's Continuing Creativity (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/18527

In this National Science Foundation video and reading selection, researchers describe the relationship between diverging color patterns in Heliconius butterflies and the long-term divergence of populations into new and distinct species.

Marine fossils in the Arctic landscape (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/86329

In this video, research is presented describing scientific studies of marine fossils found in Arctic regions.

Teaching about Hierarchy with the Encyclopedia of Life (Perspectives Video: Teaching Idea)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/LivePreview/128353

Dr. Jeff Holmes from the Harvard University Museum of Comparative Zoology discusses the Encyclopedia of Life as a teaching resource for concepts regarding hierarchical relationships of organisms.

Finding the Origins of Life in a Drying Puddle (Text Resource)

http://www.cpalms.org/Public/PreviewResourceUpload/Preview/162592

This text resource is designed to support reading in the content area. The article describes how researchers at Georgia Tech have discovered that polypeptides, which are the main component of proteins, can be formed by mixing amino and hydroxyl acids and then simply putting them through wet and dry cycles. This would be a more plausible way for early prebiotic molecules to form. Previously, the only way to produce polypeptides involved boiling temperatures, which are not conducive to life.

Earliest Beginnings

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/115288

By the end of this tutorial students will be able to identify and describe the leading scientific explanations of the origin of life on Earth.

Unit 9: Classification

SC.912.L.15.6

Discuss distinguishing characteristics of the domains and kingdoms of living organisms.

Annually Assessed on Biology EOC. Also assesses SC.912.L.15.4, SC.912.L.15.5, SC.912.N.1.3 and SC.912.N.1.6.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.15.1, SC.6.N.2.2, SC.7.N.1.6, SC.7.N.1.7, SC.7.N.2.1 and SC.8.N.1.6.

Reporting Category: Classification, Heredity and Evolution

Students will:

- Classify organisms based on the distinguishing characteristics of the domains and/or kingdoms of living organisms.
- Identify and/or describe how and/or why organisms are hierarchically classified based on evolutionary relationships.
- Identify and/or explain the reasons for changes in how organisms are classified.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and consideration of alternative explanations).
- Describe how scientific inferences are made from observations and identify examples from biology.

Resources:

Classification of Domains and Kingdoms

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/75869

This lesson is organized around the big idea Classification, Heredity, and Evolution for a high-school biology course. The design of the lesson is general, however, the 5E model can be easily incorporated. The lesson teaches students how to distinguish characteristics of living organisms belonging to the domains of Archaea, Bacteria and Eukarya and the kingdoms of Protista, Fungi, Plantae and Animalia. Make sure to view the "Animal (Classification) Song."

Classification of Living Organisms (Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/107978

By completing this tutorial, students will become more familiar with the characteristics of domains and kingdoms used to classify living organisms. You also will learn more about the reasons behind how and why this classification is done.

Could Common Earthly Organisms Thrive on Mars? (Text Resource)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/66158

This informational text resource is intended to support reading in the content area. This article asks the question: could life exist on Mars? The research depicted specifically applies to a simple, single-celled organism called a methanogen, which is in the kingdom Archaea. So far, studies have shown that these types of organisms are able to survive in manipulated environments similar to the harsh conditions on Mars.

Dichotomous Keys: Identification Achievement Unlocked (Video/Animation)

https://www.youtube.com/watch?v=wpKulkADzBk&index=28&list=PLwL0Myd7Dk1F0iQPGrjehze3eDpco1eVz

Join the Amoeba Sisters in discovering how to use a dichotomous key to identify organisms. This video also touches on the importance of scientific names.

A supporting handout may be accessed at:
http://www.amoebasisters.com/uploads/2/1/9/0/21902384/video_recap_of_dichotomous_keys_by_amoeba_sisters.pdf.

Climbing the Tree of Life: Cladograms (Teaching Idea)

http://www.cpalms.org/Public/PreviewResourceUpload/Preview/42256

This is an activity where students create cladograms given a beginning point (species) and end point (species) using the Tree of Life Project (http://tolweb.org/tree/).

Unit 10: Ecology

SC.912.L.17.5

Analyze how population size is determined by births, deaths, immigration, emigration and limiting factors (biotic and abiotic) that determine carrying capacity.

Annually assessed on Biology EOC. Also assesses SC.912.L.17.2, SC.912.L.17.4, SC.912.L.17.8 and SC.912.N.1.4.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.E.7.7, SC.7.L.15.2, SC.7.L.15.3, SC.7.L.17.3, SC.7.E.6.6, SC.8.N.4.1 and SC.8.N.4.2.

Reporting Category: Organisms, Populations, and Ecosystems

Students will:

- Use data and information about population dynamics, abiotic factors, and/or biotic factors to explain and/or analyze a change in carrying capacity and its effect on population size in an ecosystem.
- Explain that different types of organisms exist within aquatic systems due to chemistry, geography, light, depth, salinity and/or temperature.
- Describe the potential changes to an ecosystem resulting from seasonal variations, climate changes and/or succession.
- Identify positive and/or negative consequences that result from a reduction in biodiversity.
- Assess the reliability of sources of information according to scientific standards.

SC.912.L.17.9

Use a food web to identify and distinguish producers, consumers and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.

Annually assessed on Biology EOC. Also assesses SC.912.E.7.1.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.E.7.4, SC.7.L.17.1, SC.7.L.17.2, SC.7.P.11.2, SC.7.P.11.3, SC.8.L.18.3, SC.8.L.18.4 and SC.8.P.9.1.

Reporting Category: Organisms, Populations, and Ecosystems

Students will:

- Describe the energy pathways through the different trophic levels of a food web or energy pyramid.
- Analyze the movement of matter through different biogeochemical cycles

SC.912.L.17.20

Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Annually assessed on Biology EOC. Also assesses SC.912.L.17.11, SC.912.L.17.13 and SC.912.N.1.3.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.N.2.2, SC.7.E.6.6, SC.7.L.17.3, SC.7.N.1.7, SC.7.N.2.1, SC.8.N.4.1 and SC.8.N.4.2.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Predict how the actions of humans may impact environmental systems and/or affect sustainability.
- Evaluate possible environmental impacts resulting from the use of renewable and/or nonrenewable resources.
- Identify ways in which a scientific claim is evaluated (e.g., through scientific argumentation, critical and logical thinking and/or consideration of alternative explanations).

Resources:

Duck, Duck, Growth

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/128714

In this lab students will have a chance to explore the effects of limiting factors on a pair of ducks. Students will then examine why the limiting factors influences the carrying capacity of a population. Students will collect data and analyze it before drawing a conclusion about limiting factors and carrying capacity.

To The Limit (Model Eliciting Activity)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/74297

"To The Limit" MEA has students identify several factors that can affect a population's growth. Students will examine photos to list limiting factors and discuss their impact on populations. As a group they will develop a solution to minimize the impact of pollution on fish population.

Habitat Changes Related to Phosphorous Pollution in the Everglades (Video: Expert)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/154632

Watch as Dr. Stephen E. Davis, III explains how excess phosphorous pollution is impacting the Everglades.

Coral Reefs Show Remarkable Ability to Recover from Near Death (Text)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/121525

This informational text resource is intended to support reading in the content area. When corals are stressed, they release their algal partners and turn white, a phenomenon called coral bleaching. This occurs when they are under stress from warming waters or other environmental factors. Researchers monitored reefs in the Seychelles during and after coral bleaching events and found that several factors, including depth of growth, branching shape, nutrient levels and amount of fish grazing accurately predicted whether reefs were likely to recover from these events. Human impacts such as sediment or nutrient run-off also affect the corals' resiliency.

Biological Magnification in Aquatic Ecosystems

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/128825

This lesson is a hands-on, one-day lab that uses candies to simulate biological magnification. Students learn about energy transfer and DDT accumulation through tropic levels in an aquatic ecosystem.

Bioaccumulation of Methylmercury in the Everglades (Video: Expert)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/154553

Dr. Melodie Naja describes the link between agricultural pollutants and the bioaccumulation of methylmercury in the fresh surface waters of the Everglades.

Dead Stuff: The Secret Ingredient in Our Food Chain (Tutorial)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/118076

When you picture the lowest levels of the food chain, you might imagine herbivores happily munching on lush, living green plants. But this idyllic image leaves out a huge (and slightly less appetizing) source of nourishment: dead stuff. John C. Moore details the "brown food chain," explaining how such unlikely delicacies as pond scum and animal feces contribute enormous amounts of energy to our ecosystems.

Freshwater Humans

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/76006

This lesson plan teaches students about the importance of freshwater, human impact on freshwater systems and encourages students to modify their personal behavior based on information they learn in discussions and through individual research.

By-Products of Fracking (Text)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/157044

In this lesson, students will analyze an informational text that addresses accidental wastewater spills in North Dakota from the use of fracking. The text describes how fracking has caused widespread water and soil contamination. Researchers have found high levels of contaminants and salt in surface waters. Soil at the spill sites contain radium and in some places radium was found to be present even 4 years after a spill. Researchers studied almost 4,000 spill sites in North Dakota to connect the soil and water contamination directly to fracking spills. This lesson plan is designed to support reading in the content area; it includes a note-taking guide, text-dependent questions, a writing prompt, answer keys and a writing rubric.

Biogeochemical Cycles

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/130004

This lesson has been created for students to gain understanding of all the biogeochemical cycles (carbon, nitrogen, phosphorus and water). Students will navigate through a web quest and then demonstrate their understanding of one of the cycles by creating a comic strip or storybook.

Studying Biogeochemical Cycles in the Ocean (Video: Expert)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/155348

Dean Grubbs, of the Florida State University Coastal Marine Lab, discusses biogeochemical cycles in the oceans and their impact.

Salamander's Hefty Role in the Ecosystem (Text)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/64380

This informational text resource is intended to support reading in the content area. This is a fascinating article about the large role one tiny organism plays in its ecosystem. The author explores the predatory habits of the salamander, how this amphibian can affect the carbon cycle and the changes that have been taking place in the salamander populations over time.

Unit 11: Plants

SC.912.L.14.7

Relate the structure of each of the major plant organs and tissues to physiological processes.

Annually Assessed on Biology EOC.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.14.1 and SC.6.L.14.4.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Explain how the structures of plant tissues and organs are directly related to their roles in physiological processes.

Resources:

Plant Energy (Lab)

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/156476

In this lesson, students will explore the roles of roots and leaves in the process of photosynthesis with hands-on activity and a real world case of an exception in the plant kingdom. Students will compare and contrast the roles of roots and leaves in photosynthesis and relate it with the plant Rafflesia.

Flower Poetry

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/151555

In this lesson, students will dissect a flower to explore the flower's structures and their functions. Students will also observe the flowers, fruit and cones to discover the similarities and differences in their functions.

The Case of the Stolen Painting: A Forensic Mystery

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/37761

This video was conceived around the idea that students, particularly those not in AP-level classes, have a practical application for knowing about the major divisions between plants, particularly about the details of plant anatomy and reproduction.

Plant Detectives Dig into How Cells Grow (Text Resource)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/67915

This informational text resource is intended to support reading in the content area. Moss is being used as a model system that may hold the key to understanding how all plant and animal cells grow. This article shows how a deeper understanding of cell growth is being established: specifically, how the cytoskeleton directs growth.

Movement through a Plant (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/76209

The cohesion-tension theory describes how fluids move up the xylem to the leaves of a tree. With this tutorial learners will understand how water moves through a plant. Absorption and transpiration work together with cohesion and tension to move fluids from the soil, through the roots and up through the tops of the tree.

Plant Structure (Video/Audio/Animation)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/42315

Paul Andersen explains the major plant structures. He starts with a brief discussion of monocot and dicot plants. He then describes the three main tissues in plants; dermal, ground and vascular. He also describes the plant cells within each of these tissues; epidermis, parenchyma, collenchyma, sclerenchyma, xylem and phloem.

Plant Organs (Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/109414

This tutorial is designed to help students learn the concepts and skills that relate the structure of each of the major plant organs and tissues to physiological processes. Students will enhance their familiarity with the structure, function and evolutionary origins of plant tissues and organs.

Unit 12: Human Systems

SC.912.L.14.26

Identify the major parts of the brain on diagrams or models.

Annually Assessed on Biology EOC.

Florida Standards Connections: MAFS.K12.MP.4: Model with mathematics.

Prior Knowledge: Items may require the student to apply knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from SC.6.L.14.5.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Identify the major parts of the brain on diagrams.

SC.912.L.14.36

Describe the factors affecting blood flow through the cardiovascular system.

Prior Knowledge: Items may require the student to apply knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from SC.6.L.14.5.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Identify factors that affect blood flow and/or describe how these factors affect blood flow through the cardiovascular system.

SC.912.L.14.52

Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines and antibiotics.

Annually Assessed on Biology EOC. Also assesses SC.912.L.14.6, HE.912.C.1.7 and HE.912.C.1.5.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.14.6, SC.6.E.7.8, SC.8.N.4.1 and SC.8.N.4.2.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Identify and/or explain the basic functions of the human immune system, including specific and nonspecific immune responses.
- Describe how the human immune system responds to vaccines and/or antibiotics.

SC.912.L.16.13

Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.

Annually assessed on Biology EOC.

Prior Knowledge: Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of SC.6.L.14.5.

Reporting Category: Organisms, Populations and Ecosystems

Students will:

- Identify and/or describe the basic anatomy and physiology of the human reproductive system.
- Describe the process of human development from the zygotic stage to the end of the third trimester and birth.

Resources:

What's so major about your brain?

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/28110

Students will interact with a brain model and apply the major areas of the brain to the locations within their own head. In order to remember the location of the lobes, the teacher will play a short video clip of a mnemonic device known as "FlowerPOT."

Brain Basics (Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/116392

The brain isn't just one big blob sitting in your head, it's actually divided into many distinct parts. By the end of this tutorial you should be able to name the major regions of the brain and identify them on a diagram. A mnemonic device is included for the cerebellum.

Brain Structures and their Functions (Perspectives Video: Expert)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/LivePreview/119763

If you watch this video, your brain will be learning more about itself! Think about it.

The Dangers of Sticky Blood

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/128049

Students will research the dangers of high blood cholesterol levels in humans. The prevention of high cholesterol and lowering of high cholesterol to improve health of individuals will be presented in an informative online newsletter. The newsletters will be utilized to raise community awareness of the issue within the school by printing out the final products and displaying them in the school hallway. The online tool Smore will be used for constructing the newsletter and can be shared on social media to reach those that are not in the school community.

Blood Flow

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/29106

The lesson is design to describe the factors affecting blood flow through the cardiovascular system. The lesson uses the 5E model as an approach for students to become engaged, analytical and inquisitive in learning about the mechanism of blood flow and the importance of this in our body. In addition, the lesson engages the student to test variables that may affect blood flow.

Fitness and Cardiovascular Health (Perspectives Video: Professional/Enthusiast)

http://www.cpalms.org/Public/PreviewResourcePerspectivesVideo/Preview/128597

What you need to know about exercising for your heart and lungs.

What Makes Your Blood Flow? (Original Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/116899

In this tutorial you'll learn about the two loops of the human circulatory system, characteristics of blood flow and factors that affect the blood flow in your body. An introduction to blood pressure and the link to heart disease is also provided.

Back to the Basics: Immunity and Response

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/129046

The lesson was developed to broaden students' understanding of the immune system and its role in the human body. Students will do investigations and apply vocabulary terms to real-world scenarios.

Note that students will complete the 5E cycle twice over the course of two days. Please see the "Lesson Overview" document for a chronological outline of each day

The Immune System: Your Body's Private Defense System (Original Tutorial)

http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/117031

By the end of this tutorial students will be able to identify the basic functions of the immune system. Students will also be able to distinguish between nonspecific and specific immune responses.

Body's Immune System Kills Mutant Cells Daily (Text Resource)

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/64581

This informational text resource is intended to support reading in the content area. This article explores how scientists discovered that the immune system naturally suppresses cancer while they were researching how B cells change during the growth of lymphoma. The text explains how T cells work as an "immune surveillance" and can be a way of preventing blood cancers. Through experimentation, scientists discovered how vitally important those cells are to possibly suppressing other forms of cancer in the future.

Where it all begins: The Basic Structures of the Reproductive System

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/28111

Students will identify and/or describe the basic anatomy and physiology of the human reproductive system. Students will understand how the structures of the human reproductive system work together to create and deliver gametes for fertilization.

Embryonic Stem Cells

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/123436

This Khan Academy video describes what happens to a zygote as it becomes an embryo. It further explains what a stem cell is and discusses why there are questions concerning the use of stem cells.

How Do Babies Develop?

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/29098

In this lesson, students explore the development of the human fetus during pregnancy.

Additional Biology Resources:

Course Descriptions, Standards, Teacher, Student and Parent Resources

- Biology 1 http://www.cpalms.org/Public/PreviewCourse/Preview/13083
- Biology 1 Honors http://www.cpalms.org/Public/PreviewCourse/Preview/13084
- Access Biology http://www.cpalms.org/Public/PreviewCourse/Preview/12919

Biology Assessment Assistance

- Test Item Specifications http://www.fldoe.org/core/fileparse.php/5662/urlt/0077547-biologyfl11sp.pdf
- Achievement Levels and Descriptions http://www.fldoe.org/core/fileparse.php/3/urlt/aldsbioeoca.pdf
- Accommodations for Florida's Statewide Student Assessment http://www.fldoe.org/core/fileparse.php/7690/urlt/statewideassessmentaccommodations.pdf
- Content Focus Reports http://www.fldoe.org/accountability/assessments/k-12-student-assessment/end-of-course-eoc-assessments/content-focus-reports.stml

Lab Safety

- Safety in Science http://fldoe.org/academics/standards/subject-areas/math-science/science/safety-in-science.stml
- Safety Plan http://fldoe.org/finance/edual-facilities/lab-cleanout/chemical-hygiene-laboratory-safety-pla.stml
- Safety Training Resource http://data.fldoe.org/register/EdFacTraining/
- State Science Safety Manual http://fldoe.org/core/fileparse.php/9958/urlt/2015-safety-in-science.pdf

Instructional Resources

- Literacy for Learning in the Content Areas http://www.fldoe.org/academics/standards/subject-areas/literacy/
- English Language Learners Assistance http://www.cpalms.org/uploads/docs/standards/eld/SC.pdf
- Demonstrating Reading Comprehension http://www.tlc-mtss.com/assets/cd2014/data/ent-demonstraing-reading-comprehension.pdf
- Study Guides and Strategies http://www.studygs.net/
- CAST Science Writer http://sciencewriter.cast.org/welcome;jsessionid=611570183286CC17E766C7BCEDB563DD

Student Resources

- Florida Students http://www.floridastudents.org/#
- Escambia County School District: Biology End of Course Review http://www.ecsd-fl.schoolloop.com/biologyeocreview

- FLVS Biology EOC Practice Test http://ecsd-fl.schoolloop.com/file/1303568699435/1313209554176/2039757100769765468.pdf
- FLVS Biology EOC Practice Test Answer Key http://ecsd-fl.schoolloop.com/file/1303568699435/1313209554176/7534870707037578770.pdf