Course: 7th Grade/Comp.Sci.III Adv Course Code: 2002080 **Quarter: 4**

July 2012

RESOURCES COMMON CORE SCIENCE CENTER SYLLABUS

Topic(s) of Study: DNA and Modern Genetics

Bodies of Knowledge: Life Science

Big Ideas(s): Heredity and Reproduction (Unit 9), Interdependence (Unit 10)

Essential Questions: What is DNA? **(9-1)** How does biotechnology impact our world? **(9-2)** What components make up an ecosystem? **(10-1),** How does energy flow through an ecosystem? **(10-2),** How do organisms interact? **(10-3)** How do limiting factors affect Florida's ecosystems? **(10-4)**

Vocabulary: DNA, nucleotide, replication, mutation RNA, ribosome, biotechnology, artificial selection, generic engineering, clone, ecology, biotic factor, abiotic factor, population, species, community, ecosystem, habitat, niche

Common Inquiry Labs:

- **SC.7.L.16.1** Mutations Cause Diversity Fusion Lab Manual page 437 **(9-1)**
- **SC.7.L.16.4** Matching Codes Fusion Lab Manual page 445 **(9-2)**
- **SC.7.L.17.1** Pyramid of Energy Fusion Lab Manual page 469 **(10-2)**
- **SC.7.L.17.2** Measuring Species Diversity Fusion Lab Manual page 475 **(10-3)**
- **SC.7.L.17.3** How Do Disturbances Affect an Ecosystem Fusion Lab Manual page 484 **(10-4)**

	Technology Links:	
Lab Assistance:	**Science Links:**	**Science Fair Assistance:**
Scientific Methods Skills	*Vocabulary Strategies*	*Math in Science*
Writing in the Sciences	*Graphic Organizers and Reading Strategies*	*Planning for Science Fair and Competitions*
Cooperative Learning Activities	*Fold Notes*	
	Rubrics and Integrated Assessments	
	Test Taking Strategies	

Above Level **On Level** **Below Level**

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NGSSS	Outline of Content (Concept)	Target
SC.7.L.16.1 Understand and explain that every organism requires a set of instructions that specifics its traits, that this heredity information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another. (9-1) **Cognitive Complexity: High** **SC.7.L.16.4** Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society, and the environment. (9-2) **Cognitive Complexity: High**	**Unit 9 Lesson 1 (9-1)** **DNA Structure and Function** **DNA Structure** 1. Define DNA and list the components of DNA. 2. Describe Chargaff's rules concerning bases. 3. Explain Rosalind Franklin's and Watson and Cricks's contribution to knowledge about the structure of DNA. **DNA Replication** 1. Explain how DNA makes copies of itself. 2. Describe when DNA replication occurs. **Mutations** 1. Define mutation and list three different types of mutations. 2. Describe some consequences of mutations. 3. Explain why mutations occur **DNA Transcription and Translation** 1. Define the role of RNA 2. Compare RNA to DNA **Unit 9 Lesson 2 (9-2)** **Biotechnology** **Application of Biotechnology** 1. Define biotechnology. 2. Identify examples of biotechnology: including cloning, genetic, engineering, and artificial selection (selective breeding) **Biotechnology and Society** 1. Identify biotechnology's impact on individuals, society, and the environment.	• Illustrate the relationship between chromosomes, genes, and DNA. • Identify traits and genetic disorders that are controlled by genes (e.g., dimples, widow's peak, hitchhiker's thumb, tongue-rolling, colorblindness, hemophilia). • Develop an argument for and against genetic engineering and the ethical issues associated with this topic. • Research and debate the ethical considerations of biotechnology on individuals, society and the environment.
SC.7.L.17.1 Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web. (10-1, 10-2) **Cognitive Complexity: High** **SC.7.L.17.2** Compare and contrast the	**Unit 10 Lesson 1 (10-1)** **Ecology** **Introduction to Ecology** 1. Define ecology 2. Distinguish between abiotic and biotic factors **Levels of Organization in an Environment** 1. Describe the different levels of	• Explain and illustrate food chains and food webs from various ecosystems (include Florida examples). (I, II) • Explain the relationship among producers and consumers including herbivores, carnivores, and omnivores in the process of energy

Course: 7th Grade/Comp.Sci.III Adv Course Code: 2002080 **Quarter: 4**

July 2012

relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism. (10-3) **Cognitive Complexity: Moderate** **SC.912.L.17.6 :** Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism. **Cognitive Complexity: Moderate** **SC.7.L.17.3** Describe and investigate various limiting factors in the local ecosystems and their impact on native populations, including food, shelter, water, space, disease, parasitism, predations, and nesting sites (10-4) **Cognitive Complexity: High** **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.	organization in an environment **Habitat and Niche** 1. Explain what determines where a population can live. 2. Compare and contrast habitat and niche. **<u>Roles in Energy Transfer (10-2)</u>** **Producers** 1. Name life's energy source. 2. Explain how producers get energy. 3. Give examples of producers 4. Define photosynthesis **Decomposers** 1. Explain how decomposers get energy. 2. Give examples. 3. Describe their importance **Consumers** 1. Explain how consumers get energy 2. Compare and contrast types of consumers and identify examples of each. **Food Chains and Webs** 1. Define food chain, food web 2. Explain energy flow in a web and identify organisms in it. 3. Infer the consequences of removing an organism from a food web. **<u>Interactions in Communities (10-3)</u>** **Predation** 1. Define predator and prey. 2. Explain how the abundance of a prey species affects the abundance of a predator species and vive versa. 3. Identify adaptions that help predators and prey survive. **Symbiosis** 1. Explain symbiosis. 2. Distinguish among the three types of symbiosis. **Competition** 1. State the reason competition occurs. 2. List resources for which organisms compete 3. Predict effects of competition for a resource. **<u>Florida's Ecosystems (10-4)</u>** **Limiting Factors** 1. Explain how certain factors limit the size of a population.	transfer in an ecosystem. (I) • Describe the flow of energy in a food web and food chain. • Assess the effect of the removal of a population from a food web or ecosystems (primary, secondary and tertiary changes). (I, II) • Compare and contrast the benefits and limitations of food chains and food webs as models. (II) • Calculate and describe the available energy at each trophic level in an energy pyramid. (II) • Compare and contrast the relationships among organisms including mutualism, predation, parasitism, competition, and commensalism. (III) • Investigate how changes in the environment may influence the size, number, and/or diversity of organisms in a given area. (III) • Identify limiting factors (e.g., food, shelter, water, space, disease, parasitism, predation, and nesting sites) that contribute to the endangerment and extinction of native Florida organisms. (III) • Investigate and write to explain the factors that affect population changes in an ecosystem (e.g., geographic, physical or competition for resources: food, water, space, disease, parasitism, predator, nesting sites). (IV)

Course: 7th Grade/Comp.Sci.III Adv Course Code: 2002080 **Quarter: 4**

July 2012

	2. Provide examples of common limiting factors. **Florida's Land Ecosystems** 1. Identify Florida's major land ecosystems. 2. Describe effect of limiting factors on native populations in Florida's land ecosystems. **Florida's Freshwater Ecosystems** 1. Describe Florida major freshwater ecosystems. 2. Explain the effects of limiting factors on native populations in these ecosystems. **Florida's Marine Ecosystems** 1. Describe Florida's major marine ecosystems. 2. Explain the effect of limiting factors on native populations in these ecosystems.	