St. Lucie County Public Schools Scope and Sequence 2012-2013

**Course: 7th Grade** **Course Code: 2002070** **Quarter 3**

RESOURCES COMMON CORE SCIENCE CENTER SYLLABUS

**Topic of Study**: Energy and Heat, Life over Time, Reproduction and Heredity
**Bodies of Knowledge:** Physical Science, Life Science

**Big Ideas:** Energy Transfer and Transformations

**Essential Questions**:1. How is energy conserved? (6-1) 2. How is temperature related to kinetic energy? (6-2) 3. What is the relationship among heat, temperature, and thermal energy? 3. What is the theory of evolution by natural selection? (7-1) 4. What evidence supports the theory of evolution? (7-2) 5.How do cells divide? (8-1) 6. How do cells divide for sexual reproduction? (8-2) 7. How do organisms reproduce? (8-3) 8. How are traits inherited? (8-4) 9. How are patterns of inheritance studied? (8-5)

**Vocabulary:** energy transformation, law of conservation of energy, efficiency, kinetic theory of matter, temperature, degree, thermometer, thermal energy, heat, conduction, conductor, insulator, calorie, convection, radiation, evolution, artificial selection, fossil record, variation, natural selection, adaptation, extinction, fossil, fossil record, DNA, interphase, mitosis, chromosomes, mitosis, cell cycle, cytokinesis, homologous chromosome, meiosis, sexual reproduction, asexual reproduction, fertilization, heredity, genes, allele, genotype, phenotype, incomplete dominance, dominant, recessive, codominance, Punnett square, probability, ratio, pedigree

**Common Inquiry Labs:**

- **SC.7.15.1** How Do We Know What Happened When? Fusion Manual pg. 352
- **SC.7.15.2** Change in Populations Fusion Manual pg. 519
- **SC.7.15.3** Environmental Change and Evolution Fusion Manual pg. 374
- **SC.7.16.1** Offspring Models Fusion Manual pg. 418
- **SC.7.16.2** Accuracy of Punnett Square Fusion Manual pg. 427
- **SC.7.16.3** Modeling Mitosis Fusion Manual pg. 385
- **SC.7.16.4** Matching Codes Fusion Manual pg. 444
- **SC.7.17.1** Food Webs Fusion Manual pg. 507
- **SC.7.17.2** Measuring Species Fusion Manual pg. 475
- **SC.7.17.3** How Do Populations Interact? Fusion Manual pg. 495

| | **Technology Links:** | |
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| **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* | |

**Teacher's Links to Online Guides:**

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

| NGSSS | Outline of Content | Target |
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| **SC.7.P.11.1** Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state. **Cognitive Complexity: Low**<br><br>**SC.7.P.11.2** Investigate and describe the transformation of energy from one form to another. **Cognitive Complexity: Moderate**<br><br>**SC.7.P.11.4** Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature. **Cognitive Complexity: Moderate** | **<u>Unit 6 Lesson 1</u>**<br>**Forms of Energy**<br>1. List several different forms of energy.<br>2. Provide examples of each form of energy.<br>**Energy Conservation and Transformation**<br>1. Explain the law of conservation of energy.<br>2. Cite evidence that energy cannot be created or destroyed, only changed from one form to another.<br>3. Describe the transformation of energy from one form to another.<br>4. Identify situations in which energy is transformed from one form to another.<br>**Energy Efficiency**<br>1. Calculate the efficiency of an energy transformation.<br>2. Define efficiency.<br><br>**<u>Unit 6 Lesson 2</u>**<br>**Kinetic Theory of Matter**<br>1. Explain the kinetic theory of matter.<br>2. Compare the speeds of particles in solids, liquids, and gases.<br>**Temperature and Measuring Temperature**<br>1. Define temperature, degree, and thermometer,<br>2. Relate temperature to kinetic energy of particles.<br>3. Measure temperature using different scales.<br><br>**<u>Unit 3 Lesson 3</u>**<br>**Thermal Energy**<br>1. Define thermal energy.<br>2. Differentiate between thermal energy and temperature.<br>**Heat**<br>1. Define heat and calorie.<br>2. Differentiate between heat and temperature.<br>3. Differentiate between heat and thermal energy. | • Apply the Law of Conservation of Energy during an energy transfer.<br>• Experiment with and measure the transfer of thermal energy.<br>• Investigate how energy can be transformed from one form to another.<br>• Describe how energy can be transferred by radiation, conduction, and convection.<br>• Describe the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.<br>• Experiment to demonstrate that energy conversions are never 100% efficient (concept of entropy).<br>• Measure temperature using a Celsius thermometer.<br>• Investigate how energy changes can lead to a change in state of matter. |

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| | **Changes of State**<br>1. Explain that adding heat to or removing heat from a system may result in a change of state.<br>**Methods of Thermal Energy Transfer**<br>1. Define conduction, conductor, insulator, convection, and radiation. | |
| **SC.7.L.15.1** Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species. **Cognitive Complexity: Moderate**<br><br>**SC.7.L.15.2** Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms. **Cognitive Complexity: High**<br><br>**SC.7.L.15.3** Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species. **Cognitive Complexity: High**<br><br>**SC.7.L.16.2** Determine the probabilities for genotype and phenotype combinations | **<u>Unit 7 Lesson 1</u>**<br>**Charles Darwin's Observations**<br>1. Define evolution.<br>2. Describe Darwin's observations.<br>3. Define species, population, variation, adaptation, and artificial selection.<br>**Natural Selection**<br>1. Define natural selection<br>2. Describe the four parts of natural selection.<br>3. Describe the impact of environmental change on the survival of a species (extinction) and the role of adaptations in a species' survival.<br>**Fossil Evidence**<br>1. Define fossil.<br>2. Briefly describe how fossils form.<br>3. Define fossil record.<br>4. Describe how scientists use fossil evidence to determine relationships between organisms.<br>**Structural Evidence**<br>1. Define common ancestor.<br>2. Describe how vestigial organs are evidence for evolution.<br>3. Define DNA.<br>4. Define chromosome.<br><br>**<u>Unit 8 Lesson 1</u>**<br>**Mitosis**<br>1. Define cell cycle and identify its three stages.<br>2. Describe interphase.<br>3. Define mitosis.<br>4. Name the four phases of mitosis.<br>5. Define cytokinesis.<br>**<u>Unit 8 Lesson 2</u>**<br>**Meiosis**<br>1. Define mitosis.<br>2. Name the phases of meiosis<br>3. Compare mitosis and meiosis | • Recognize that fossils are the remains of organisms and provide evidence that is consistent with the theory of evolution.<br>• Compare and contrast past and present organisms referencing the fossil record.<br>• Observe and make inferences about various biological adaptations (e.g., changes in structure, behaviors, physiology) that organisms need to survive and how they relate to the principles of natural selection and diversity.<br>• Explore the ways natural selection equips organisms for survival in their environment (e.g., camouflage, poison).<br>• Investigate the inability of a species to adapt within a changing environment may contribute to the extinction of that species.<br>• Create a timeline of how scientific knowledge changed over time: spontaneous generation to biogenesis to Lamarck's theory of acquired characteristics to Darwin's theory of natural selection.<br>• Compare and contrast mitosis and meiosis.<br>• Describe meiosis as a process of sexual reproduction that produces sperm and egg cells.<br>• Collect, analyze, and draw conclusions from data of |

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| using Punnett Squares and pedigrees.<br>**Cognitive Complexity: Moderate**<br><br>**SC.7.L.16.3** Compare and<br>contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.<br>**Cognitive Complexity: Moderate** | **Unit 8 Lesson 3**<br>**Sexual & Asexual Reproduction**<br>1. Define sexual and asexual reproduction<br>2. Describe advantages of asexual and sexual reproduction<br>**Unit 8 Lesson 4**<br>**Heredity**<br>1. Define heredity<br>2. Describe how traits are inherited<br>3. Define dominance, codominance<br>**Unit 8 Lesson 5**<br>**Punnett Squares and Pedigrees**<br>1. Create and use Punnett squares to predict the outcome of certain traits<br>2. Create and interpret a pedigree chart | inherited traits.<br>• Predict and analyze the genetic (genotype) and physical (phenotype) characteristics of offspring using Punnett Squares and pedigrees.<br>• Differentiate between genotype and phenotype.<br>• Predict possible parental genotype based on observable phenotype of offspring.<br>• Construct Punnett Squares and pedigrees through multiple generations.<br>• Observe inherited traits on a personal level with family pets or members.<br>• Research dominant and recessive traits then apply concepts to identify such traits among classmates.<br>• Explain the relationship between genotype and phenotype.<br>• Compare and contrast homozygous and heterozygous alleles.<br>• Explain Gregor Mendel's contribution to the development and understanding of genetics.<br>• Critique Mendel's experiments, identifying the scientific process and variables used in the experiment.<br>• Apply concepts to complete Punnett Squares to predict the genotype and phenotype probability of an offspring. |