July 2012

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

Course: 6th Grade **Course Code: 2002040** **Quarter: 1**

RESOURCES **COMMON CORE** **SCIENCE CENTER** **SYLLABUS**

Topic of Study: Thinking and Working like a Scientist ***(Fusion Units #1 & #5)***

Bodies of Knowledge: Nature of Science

Big Ideas: 1. The Practice of Science; **2.** Characteristics of Scientific Knowledge; **3** The Role of Theories, Laws, Hypotheses, and Models **12.** Motion of Objects

Essential Questions: How is science different from other fields of study? **(1-3)** How do we know about the world we live in? **(1-2)** How do scientists work? **(1-3)** In what ways can you organize data to fully understand them? **(1-4)** How does science affect our lives? **(1-5)** How is mechanical energy conserved? **(5-1)** How are distance, time, and speed related? **(5-2)**

Vocabulary: science, empirical evidence, theory, model, law, experiment, observation, hypothesis, variable, data, model, energy, kinetic energy, potential energy, mechanical energy, law of conservation of energy, position, reference point, motion, speed, vector, velocity

Common Inquiry Labs:

- **SC.6.N.2.2**-Science Charades: Quick Lab/Lab Manual p.1 **(1-1)**
- **S.C.6.N.3.2**-Scientific Law Game TE Exploration Lab p.31 **(1-2)**
- **SC.6.N.1.2**-The Importance of Replication: Quick Lab/Lab Manual p.16 **(1-3)**
- **SC.6.N.1.1/SC.6.N.1.4**-Measuring Speed TE p.17 **(1-1)**
- **SC.6.P.11.1**-Bungee Jumping: TE p.393 **(5-1)**
- **SC.6.P.12.1**-Video Lab: Animals in Motion: Online www.Thinkcentral.com

	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	*Lessons for Substitutes*
	Test Taking Strategies	

Teacher's Links to Online Guides:

Above Level On Level Below Level

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NGSSS	Outline of Content	Target(s)
SC.6.N.2.1 Distinguish science from other activities involving thought. **(1-1)** **SC.6.N.1.5** Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence. **(1-1)** **SC.6.N.1.3** Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each. **(1-3)**	**Unit 1 Lesson 1 (N.1.5, N.2.1)** **Distinguishing Science from Other Forms of Inquiry** 1. Science is a systematic way of studying the world. 2. Scientists base their explanations on evidence. **Scientific Explanations and Habits of Mind** 1. Facts are supported by empirical evidence. **Science & Creativity** 1. Scientists use their imagination.	• Explain the difference between an experiment and other types of scientific investigations. • Describe the creative means scientists must use to design an investigation. • Recognize systematic inference as one form of scientific investigation. • Explain that science is based on factual based evidence. • Use appropriate reference materials to support scientific investigations of various types, such as systematic observation or experiments.

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.6.N.2.2 Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered. **(1-2)** **SC.6.N.3.1** Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life. **(1-2)** **SC.6.N.3.2** Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws. **(1-2)** **SC.6.N.3.3** Give several examples of scientific laws. **(1-2)**	**Unit 1 Lesson 2 (N.2.2, N.3.1-3.3)** **Types of scientific explanations** 1. Science knowledge is explained through scientific theories, models, and scientific laws. **Assessing Scientific Information** 1. Reliability of scientific information can be assessed by its source. **Lab Safety** A. TEACHER NOTE: download and refer to safety contract on resource page. B. Identify and discuss lab safety equipment in classrooms. C. Lab Safety Plan (refer to objective.	• Compare and contrast the terms that describe examples of scientific knowledge such as: theory, law, hypothesis, and model. • Cite examples of scientific laws. • Distinguish between laws and theories by understanding that laws describe *the what* and theories explain *the why*. • Give examples of how advances in technology have affected scientific theories and laws. • Distinguish the difference between a scientific law and theory vs. a societal law. • Distinguish between a scientific theory and a general claim. • Recognize, identify and know how to safely and accurately use lab equipment. • Explain appropriate science lab behavior (no playing or pushing, no food/drink, no running, do not touch anything until told, etc…). • Describe the importance of following all written or oral directions of the teacher when conducting an investigation. • Identify protective clothing worn in the lab: safety goggles, aprons, gloves. • Recognize that different types of wastes are disposed of in specific ways. • Create a lab safety plan for the classroom.

SC.6.N.1.2 Explain why scientific investigations should be replicable. **(1-3)**	**Unit 1 Lesson 3 (N.1.1, N.1.2, N.1.3, N.1.4)** **Types of Scientific Investigations** 1. Scientists investigate to learn about the natural world. **Conducting a Scientific Experiment** 1. Well-planned investigations use accepted methods. **Characteristics of Good Scientific Investigations** 1. Replication and review have value.	. • Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals. • Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered. • Justify conclusions based upon all the available evidence, not on expressed opinions. • Distinguish science from other activities involving thought. •

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SC.6.N.3.4 Identify the role of models in the context of the sixth grade science benchmarks. **(1-4)** **SC.6.N.2.3** Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals. **(1-1,5)**	**Unit 1 Lesson 4 (N.1.1, N.3.4)** **Tables** 1. Data tables are used for recording and organizing data. **Graphs** 1. Graphs are used to analyzing data. **Models** 1. Models allow scientists to study an object or process in greater detail.	. • Explain why models are used in science to observe processes that happen too slowly, too quickly, or are too small or vast for direct observation. • Give examples of visual/physical, mathematical, and conceptual models as used in science.

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SC.6.P.11.1 Explore the law of Conservation of energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa. **(5-1)** **SC.6.P.12.1** Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship. **(5-2)**	**Unit 5 Lesson 1 (P.11.1)** **Kinetic Energy** 1. Energy is the ability to cause change or do work. 2. Kinetic Energy **Potential Energy** 1. Potential Energy **Mechanical Energy and Energy Conservation** 1. Mechanical energy includes both kinetic and potential energy and is conserved within a closed system. 2. The Law of Conservation of Energy **Unit 5 Lesson 2 (P.12.1)** **Motion** 1. Motion occurs when an object travels from one point to another. **Speed** 1. Distance and time are used to calculate speed. **Distance-Time Graphs** 1. You can analyze speed with a distance-time graph. **Velocity** **1.** Velocity consists of speed and direction.	• Explain what energy is and provide an example. • Compare and contrast potential and kinetic energy. • Identify and describe instances where potential energy is transformed to kinetic energy. • Identify and describe instances where kinetic energy is transformed to potential energy. • Apply concepts of potential and kinetic energy in an investigation activity. • Differentiate between a theory and a law using a graphic organizer. • Diagram the transfer of energy and apply it in a real world scenario. • Explain the Law of Conservation of Energy in a real life example. • Describe the time in history in which the law of conservation was discovered. • Define a problem using the law of conservation. • Make observations on how motion occurs with respect to a particular reference point. • Measure the distance objects move using SI units. • Record the time it takes for and object to move a given distance. • Tabulate speed and average speed solving for different variables. • Interpret and analyze various motion graphs. • Record various distances and times through an inquiry activity. • Construct a distance versus time graph using student collected data. • Calculate and compare multiple speeds over time on a line graph. • Differentiate between average speed and constant speed to describe a trip.

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SC.6.N.1.1 Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions. **(1-3,4)** **SC.6.N.1.4** Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation. **(1-3)**	Science Fair	• Define a scientific problem or question from the sixth grade curriculum. • Develop a hypothesis with one testable independent variable. • Explain why scientific investigations should be replicable. • Conduct, discuss, and compare similar investigations by working cooperatively in groups. • Collect and organize data in charts, tables, and graphics. • Present individual or group data after a scientific investigation, analyze the evidence, and reach a class consensus. • Justify conclusions based upon all the available evidence, not on expressed opinions.
MA.6.A.3.6 Construct and analyze tables, graphs and equations to describe linear functions and other simple relations using both common language and algebraic notation. Cognitive Complexity: High	Science Fair	