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

Course: 5th Grade **Course Code: 5020010** **Quarter: 3**

Topic(s) of Study: Energy and Energy Transformations

Bodies of Knowledge: Physical Science

Big Idea(s): **10.** Forms of Energy, **11.** Energy Transfer and Energy Transformations

Essential Questions: How is the motion of an object affected by energy? How do electrical charges react to other electrical charges? How does one form of energy transform into another form of energy? How does a closed circuit complete the flow of electricity?

Optional Teacher Background: *ScienceSaurus*-Physical Science Section

RESOURCES **SCIENCE CENTER**

Vocabulary: energy, potential energy, kinetic energy, chemical energy, mechanical energy, electrical energy, static electricity, electric current, electric motor, electromagnet, generator, conductor, insulator, circuit, series circuit, parallel circuit

Common Inquiry Labs:

- *Science Fusion* Inquiry Flipchart "Seeing Sound Energy" & "Light Travels" p. 23
- *Science Fusion* Inquiry Flipchart "What changes can energy cause?" p. 24
- *Science Fusion* Inquiry Flipchart "Static Cereal!" & "A Big Charge!" p. 25
- *Science Fusion* Inquiry Flipchart "How do electric charges interact?" p. 26
- *Science Fusion* Inquiry Flipchart "Build an Electromagnet" & "Is there current?" p. 27
- *Science Fusion* Inquiry Flipchart "What is an electric circuit?" p. 28
- *Science Fusion* Inquiry Flipchart "Compare Two Circuits" & "Bright Lights" p. 29

	Technology Links:	
Lab Assistance:	**Science Links:**	**Online Guides:**
Daily Inquiries	www.Thinkcentral.com	Above Level
Logs and Mini Lessons	Fusion Teacher Resources	On Level
	Graphic Organizers	Below Level

NGSSS	CONTENT	TARGETS
SC.5.P.10.1 Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical. Cognitive Complexity: **Moderate** SC.5.P.10.2 Investigate and explain that energy has the ability to cause motion or create change. Cognitive Complexity: **High** SC.5.P.10.3 Investigate and explain that an electrically-charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects. Cognitive Complexity: **High** SC.5.P.10.4 Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion. Cognitive Complexity : **High**	What are some basic forms of energy? ▪ Light ▪ Heat ▪ Sound ▪ Electricity ▪ Chemical ▪ Mechanical – energy of motion What can energy do? ▪ Put an object in motion ▪ Stop an object from moving ▪ Change the direction of an object moves What will an electrically charged object do? ▪ An electrically charged object will attract an uncharged object ▪ An electrically charged object will repel another electrically charged particle What can electrical energy be transformed into? A. Heat B. Light C. Sound D. Mechanical – energy of motion E. Other energy transformations	▪ Describe various forms of energy. ▪ Explain how various forms of energy are used. ▪ Use empirical observations to draw a conclusion. ▪ Explain that an increase in thermal energy causes the liquid in a thermometer to expand and move. ▪ Demonstrate that solar energy can cause an object's temperature to change. ▪ Explain what causes static electricity. ▪ Describe how charged particles interact with one another. ▪ Relate electricity to magnetism. ▪ Describe the interaction between a charged object and an uncharged object. ▪ Describe the interaction between two objects with the same charge. ▪ Demonstrate the ability of a charged object to attract or repel another object, even if the two objects are not touching. ▪ Identify ways in which electrical energy can be transformed into heat, light, sound, and motion. ▪ Describe how electricity is generated. ▪ Explain why energy conservation is important and identify some ways to conserve electricity.
SC.5.P.11.1 Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop). Cognitive Complexity: **Moderate** SC.5.P.11.2 Identify and classify materials that conduct electricity and materials that do not Cognitive Complexity: **Moderate**	The flow of electricity requires a closed circuit. What are some materials that conduct electricity? ▪ Metals What are some materials that do not conduct electricity? ▪ Rubber ▪ Wood ▪ Other non-metals	▪ Build a simple series circuit. ▪ Determine that electricity flows through a circuit only when the circuit is closed. ▪ Test materials and identify them as either conductors or insulators of electricity. ▪ Explain that observations can be used as evidence to support a scientific explanation. ▪ Analyze circuits and explain how they work. ▪ Identify elements in a circuit that transform electrical energy into heat, light, sound, and motion. ▪ Identify conductors and insulators of electricity.

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Topic(s) of Study: Matter

Bodies of Knowledge: Physical Science

Big Idea(s): 8. Properties of Matter, **9.** Changes in Matter

Essential Questions: How do we describe matter using relationships between physical properties? How do the physical properties of an object affect the object's ability to go through a physical or chemical change? How can conditions affect the rate a substance dissolves in water? How are scientific inquiry and knowledge useful in solving problems?

Optional Teacher Background*: ScienceSaurus*- Physical Science Section

Vocabulary: matter, temperature, volume, gas, liquid, solid, physical change, chemical change, reaction, mixture, solution, atom, atomic theory, element, compound

Common Inquiry Labs:

- *Science Fusion* Inquiry Flipchart "Find the freezing point" & "Playing with properties" p. 17
- *Science Fusion* Inquiry Flipchart "Observe some chemical changes" & "Shhh! Secret Messages" p. 18
- *Science Fusion* Inquiry Flipchart "How can temperature change matter?" p. 19
- *Science Fusion* Inquiry Flipchart "An Inky Mixture" & "Does it dissolve?" p. 20
- *Science Fusion* Inquiry Flipchart "What affects the speed of dissolving?" p. 21
- *Science Fusion* Inquiry Flipchart "Make model atoms and compounds" & "Research is Elemental" p. 22

NGSSS	CONTENT	TARGETS
SC.5.P.8.1 Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature. Cognitive Complexity: **Moderate** SC.5.P.8.2 Investigate and identify materials that will dissolve in water and those that will not and identify the conditions that will speed up or slow down the dissolving process. Cognitive Complexity: **High** SC.5.P.8.3 Demonstrate and explain that mixtures of solids can be separated based on observable properties of their	What are the properties of solids? ▪ Retains a fixed volume and shape ▪ Not easily compressible, little free space between particles ▪ Does not flow easily, rigid, particles cannot move or slide past one another What are the properties of liquids? ▪ Forms to the shape of the part of the container it occupies ▪ Not easily compressible, little free space between particles ▪ Flows easily, particles can move/slide past one another What are the properties of a gas? ▪ Forms to the shape and volume of its container ▪ Compressible, lots of free space	▪ Describe some physical properties of matter. ▪ Relate the states of matter to temperature and the arrangement and movement of particles. ▪ Compare and contrast mixtures and solutions. ▪ Determine ways that mixtures can be separated.

parts such as particle size, shape, color, and magnetic attraction. Cognitive Complexity: **Moderate**	between particles ▪ Flows easily, particles can move past one another Some materials will dissolve in water and some will not.	
SC.5.P.8.4 Explore the scientific theory of atoms (also called atomic theory) by recognizing that all matter is composed of parts that are too small to be seen without magnification. Cognitive Complexity: **Low**	What are some conditions that can affect the rate at which materials are dissolved? ▪ Heat speeds up the rate of the dissolving process ▪ Particle size will affect the rate of the dissolving process ▪ Stirring speeds up the rate of the dissolving process Mixtures of solids can be separated. All matter is made up of particles that are too small to be seen with the naked eye (theory of atoms).	▪ Classify substances based on whether they dissolve in water. ▪ Identify ways to change the rate at which a substance dissolves. ▪ Experiment to determine how temperature, stirring, and particle size affect the rate at which substances dissolve. ▪ Explain that matter is made of atoms and describe the structure of an atom. ▪ Identify some elements and describe how elements differ from one another. ▪ Compare an element to a compound.
SC.5.P.9.1 Investigate and describe that many physical and chemical changes are affected by temperature. Cognitive Complexity: **High**	How can temperature affect physical changes? ▪ Increased temperature expands materials (except water) ▪ Decreased temperature condenses materials ▪ States of matter How can temperature affect chemical changes? ▪ Increased temperature can speed up a chemical change ▪ Decreased temperature can slow down a chemical change	▪ Compare solids, liquids, and gases based on their physical properties. ▪ Compare and contrast physical changes and chemical changes. ▪ Understand how temperature can affect physical changes and chemical changes.