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

Course: 8th Grade/Comp.Sci.III adv Course Code: 2002110 Quarter: 2

RESOURCES COMMON CORE SCIENCE CENTER PACING GUIDE

Topic(s) of Study: Atomic Structure, Properties of Matter and Matter and Energy Cycle

Bodies of Knowledge: Physical Science and Life Science

Big Ideas(s): 1: Matter (unit 6) 2. Cycling of Matter and Energy (Unit 7)

Essential Questions: What are the physical and chemical properties of matter? **(6-3)** How do particles in solids, liquids and gases move? **(6-4)** How do pure substances and mixtures compare? **(6-5)** What makes up an atom? **(6-6)** How are elements arranged on the periodic table? **(6-7)** How do cells get and use energy **(7-1)** How do energy and matter move through ecosystems **(7-2)**

Vocabulary: physical change, chemical change, law of conservation of mass, solid, liquid, gas, atom, element, compound, mixture, pure substance, heterogeneous, homogeneous, nucleus, atomic number, proton, electron, mass number, neutron, electron cloud, photosynthesis, chlorophyll, cellular respiration, energy, law of conservation of energy, energy pyramid, matter, law of conservation of mass, carbon cycle.

Common Inquiry Labs:

- **SC.8.P.8.5** Comparing Two Elements Fusion Manual pg. 282**(6-5)**
- **SC.8.P.8.6** Rearranging the Periodic Table Fusion Manual pg. 298**(6-7)**
- **SC.8.P.8.7** A Model Atom Fusion Manual pg. 288**(6-6)**
- **SC.8.P.8.8** The pH Scale Fusion Manual pg. 284**(6-5)**
- **SC.8.P.8.9** Properties of Combined Substances Fusion Manual pg. 263**(6-5)**
- **SC.8.P.9.1** What's in a Change Fusion Manual pg. 269**(6-3)**
- **SC.8.P.9.2** Change of Pace Fusion Manual pg. 323**(6-6)**
- **SC.8.L.18.1** Reversing Equations Fusion Manual pg. 337**(7-1)**
- **SC.8.L.18.2** Investigating Respiration with Chemical Indicators pg. 340**(7-1)**
- **SC.8.L.18.3** Model the Carbon Cycle Fusion Manual pg. 348**(7-2)**
- **SC.8.L.18.1** Conservation of Mass Fusion Manual pg. 355**(7-1)**

	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	*Lessons for Substitutes*

Above Level On Level Below Level

NGSSS	Outline of Content	Targets
SC.8.P.9.1 Explore the Law of Conservation of mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes. **(6-3)** **Cognitive Complexity: High** **SC.8.P.9.2** Differentiate between physical changes and chemical changes. **(6-3)Cognitive Complexity: Moderate** **SC.8.P.9.3** Investigate and describe how temperature influences chemical changes. **(6-3)Cognitive Complexity: High** **SC.P.8.1** Explore the scientific theory of atoms of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids and gases. **(6-4)Cognitive Complexity: Moderate** **SC.912.P.8.1 :** Differentiate among the four states of matter. **(6-4)** **Cognitive Complexity: Moderate** **SC.8.P.8.5** Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that that make up all of the living and nonliving things that we encounter. **(6-5)** **SC.P.8.8** Identify basic examples of and compare and classify the properties of compounds, including acids, bases and salts. **(6-5)Cognitive Complexity: Moderate**	**Unit 6 Lesson 3** **Physical and Chemical Changes** Physical Change 1. Define Physical change 2. Identify physical changes of matter Chemical Change 1. Define chemical change 2. Define how temperature influences chemical changes Comparing Physical and Chemical Changes 1. Differentiate between physical changes and chemical changes 2. Identify signs of chemical changes of matter Law of Conservation of Mass 1. Describe the law of conservation of Mass **Unit 6 Lesson 4** **States of Matter** Particles in Motion 1. State that the particles that make up matter are constantly in motion. 2. Describe the motion of particles in solids, liquids, and gases. Properties of Solids, Liquids, and Gases. 1. Infer how the movement of particles in solids, liquids, and gases affect the properties of solids, liquids, and gases. **Unit 6 Lesson 5** **Pure Substances and Mixtures** How Particles Combine 1. Describe different ways in which the particles that make up matter can combine to form various substances. Pure Substances: Elements and Compounds 1. Classify elements and compounds as two types of pure substances. 2. Name and classify examples of common elements and compounds.	• Determines the physical properties of an object using quantitative observations such as freezing point, boiling point, melting point by creating a data table of those properties and distinguishing the differences between qualitative and quantitative data at a later date and then reaching a class consensus. • Determines the physical properties of an object using qualitative observations such as, thermal conductivity, electrical conductivity, magnetism, boiling and freezing points by creating a table of those properties. • Describe properties of compounds as acids, bases, or salts by creating a data table. • Investigates a variety of chemical changes and identifies the indicators that determine a chemical change has occurred (e.g., color change, release of gas/odor, formation of new substance) by conducting as lab which involves many chemical and physical changes in which they need to analyze, distinguish and justify (using appropriate reference materials) whether they were chemical or physical changes • Demonstrates that physical changes do not result in new substances by conducting the previous lab. • Investigates and classifies

SC.912.P.8.11 : Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH. (**6-5) Cognitive Complexity: Moderate** **SC.8.P.8.9** Distinguish among mixtures (including solutions) and pure substances. **(6-5) Cognitive Complexity: Moderate** **SC.912.P.8.7 :** Interpret formula representations of molecules and compounds in terms of composition and structure. **Cognitive Complexity: Moderate** **SC.8.P.8.7** Explore the scientific theory of atoms(also known as the atomic theory) by recognizing that atoms are the smallest particles (surrounding a nucleus containing protons and neutrons) **(6-6) Cognitive Complexity: Low** **SC.912.P.8.4 :** Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom. **(6-6) Cognitive Complexity: High** **SC.8.P.8.6** Recognize that elements are grouped in the periodic table according to similarities of their properties**. (6-7) Cognitive Complexity: Low** **SC.912.P.8.5 :** Relate properties of atoms and their position in the periodic table to the arrangement of their electrons. **(6-7) Cognitive Complexity: Moderate**	Mixtures 1. Compare homogenous and heterogeneous mixtures 2. Classify mixtures as solutions, colloids, and suspensions; and devise methods by which to separate the components of various mixtures. **Unit 6 Lesson 6** **The Atom** Atomic Theory 1. Define atom. 2. Describe the atomic theory The Parts of the Atom 1. State the location, charge, and relative size and mass of protons, neutrons, and electrons in an atom. 2. Identify the nucleus and electron cloud in a model of an atom. 3. Determine the atomic mass number and mass of an atom. **Unit 6 Lesson 7** **The Periodic Table** Information on the Periodic Table 1. Identify the atomic number, chemical symbol, name and average atomic mass of an element on the periodic table. 2. Compare and contrast the properties if metals, nonmetals, and metalloids. The Arrangements of Elements on the Periodic Table. 1. Describe the arrangement of elements in groups and periods on the periodic table.	physical and chemical changes in a variety of substances by creating a chart that represents understanding of chemical versus physical changes and writing a summary of their findings then reaching a class consensus. • Demonstrates that chemical changes result in substances with different properties by conducting the previous lab. • Classifies materials as pure substances, compounds, suspensions, solutions, or mixtures by providing several examples of each for students to separate and classify. • Recognizes that elements are pure substances made of only one kind of atom by having students classify different substances as pure substances or as mixtures. • Describe the theory of atoms (atomic theory) based on the motion of particles in solids, liquids and gases by diagramming and illustrating the particle spacial relationship of solids, liquids, and gases. I • Design a model or drawing of an atom that shows the location and charge of subatomic particles. • Compare and contrast subatomic particles and their properties by creating a chart that includes location, charge and mass. • Compare atomic number and mass number of atoms by creating a chart for the first 18 elements listing the number of protons, electrons and neutrons

		found by using the atomic number and atomic mass. I • Identify the name and symbol of elements from the periodic table by conducting a memorization technique. • Explains the organization of the Periodic Table by diagramming several trends of the periodic table using a blank table. • Calculate the average atomic mass of an atom by providing several examples for students to practice from such as carbon isotopes. • Understand how the periodic table is arranged as families/groups (columns) and periods (rows) by analyzing the role of valence electrons and electron levels. • Compare and contrast the properties of elements based on their families and grouping by creating Venn Diagrams for various elements. • Identify electron arrangement as it relates to energy levels and periods in the periodic table by illustrating the electron placement of various elements.
SC.8.L.18.1 Describe and investigate the process of photosynthesis such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen **(7-1) Cognitive Complexity: High** **SC.912.P.8.7 :** Interpret formula representations of molecules and compounds in terms of composition and structure. **(7-1) Cognitive Complexity: Moderate**	**Unit 7 Lesson 1** **Photosynthesis and Cellular Respiration** Cells Need Energy 1. State that all organisms need energy. 2. Explain how organisms get energy Photosynthesis 1. Define and describe photosynthesis. 2. List the starting materials and the products of photosynthesis. 3. State the location where	• Design an experiment and collect data that illustrates the importance of light and its effect on the production of oxygen in the process of photosynthesis. • Conduct an experiment that demonstrates the need for carbon dioxide in the process of photosynthesis. • Illustrate and/or demonstrate the roles of

SC.912.L.18.7 : Identify the reactants, products, and basic functions of photosynthesis. **(7-1) Cognitive Complexity: Moderate** **SC.8.L.18.2** Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide **(7-1) Cognitive Complexity: High** **SC.912.L.18.8 :** Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration. **(7-1) Cognitive Complexity: Moderate** **SC.912.L.18.9 :** Explain the interrelated nature of photosynthesis and cellular respiration. **(7-1) Cognitive Complexity: Moderate** **SC.8.L.18.3** Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their environment**. (7-2) Cognitive Complexity: High** **SC.8.L.18.4** Cite evidence that living systems follow the laws of conservation of mass and energy. **(7-2) Cognitive Complexity: High**	photosynthesis takes place. Cellular Respiration 1. Define and describe cellular respiration. 2. List the starting materials and the products of cellular respiration 3. State the location where cellular respiration takes place. **Unit 7 Lesson 2** **Energy and Matter in Ecosystems** Matter and Energy in Ecosystems 1. Define matter and energy 2. Identify the sun as the source of energy in most ecosystems 3. Explain how organisms use food. Conservation of Matter and Energy 1. State the law of conservation of matter and energy. 2. Explain how ecosystems function as open systems. Energy Pyramids 1. Describe how some energy taken in is used immediately and some is stored. 2. Interpret an energy pyramid. Carbon and other Cycles of Matter **1.** Describe the carbon cycle: list other types of matter that are cycled in an ecosystem	chlorophyll, carbon dioxide, and water in the process of photosynthesis by creating a diagram that includes all the above mentioned. • Compare and contrast photosynthesis and respiration by illustrating, diagramming, and creating a Venn diagram for both phases. • Deduce that living things can survive only in environments in which their needs can be met (e.g., such as animals need air, water, and food; plants require air, water, nutrients, and light) by having students choose an organism and predict what would happen as each one of the prior mentioned factors were removed from the environment. • Diagram how water and carbon are never lost nor gained in an ecosystem, but rather recycled (Law of Conservation of Mass). • Describe and investigate how cellular respiration breaks down food to provide energy and then releases carbon dioxide • Construct a scientific model of the carbon cycle to show how matter and energy are continuously recycled within and between the living and nonliving world by illustrating a diagram of the cycle. • Analyze the inefficiency of energy transfer through the use of an energy pyramid by comparing the sizes of the levels as you ascend through the pyramid. • Draw conclusions based on evidence that living

		systems follow the Law of Conservation of Energy (e.g., food chains, food webs, energy pyramids) by illustrating one of the prior topics and showing how the materials are recycled back into the environment. • Describe and label the transfer of energy within a food chain by drawing and illustrating one including the energy transfer.
LA.6.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information and include a list of sources used. **(6-3)(6-4)(7-1)** **LA.8.2.2.3** The student will organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing or comparing/contrasting. **(6-6)**		