Okeechobee County

Comprehensive Science 3

Curriculum Map

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2016-2017

Parts of the Curriculum Map

Units: the broadest organizational structure used to group content and concepts within the curriculum map assessed through Common Unit Assessments (CUA).

Pacing: recommended time frames created by teacher committees, using CCE and CUA data, within which the course should be taught in preparation for the CCE and SSA (formerly known as FCAT) Tests.

Topics: a grouping of standards and skills that form a subset of a unit; all topics under a unit are assessed on the Common Unit Assessments (CUA).

Learning Targets and Skills: the content knowledge, processes, and skills that will ensure successful mastery of the standards.

Standards: the Next Generation Sunshine State Standards (NGSSS) required by course descriptions posted on CPALMS by FLDOE.

Vocabulary: the content-specific vocabulary or phrases both teachers and students should use, and be famIlCUAr with, during instruction.

Resources: a listing of available, high quality and approprCUAte materCUAls, including: strategies, lessons, textbooks, videos and other medCUA sources, that are aligned with the standards.

Teacher Hints: a listing of considerations when planning instruction, including guidelines to content that is inside and outside the realm of the course descriptions on CPALMS.

Sample FOCUS Questions: Sample questions aligned to the standards and in accordance with SSA style, rigor, and complexity guidelines; they do NOT represent all the content that should be taught, but merely a sampling of it.

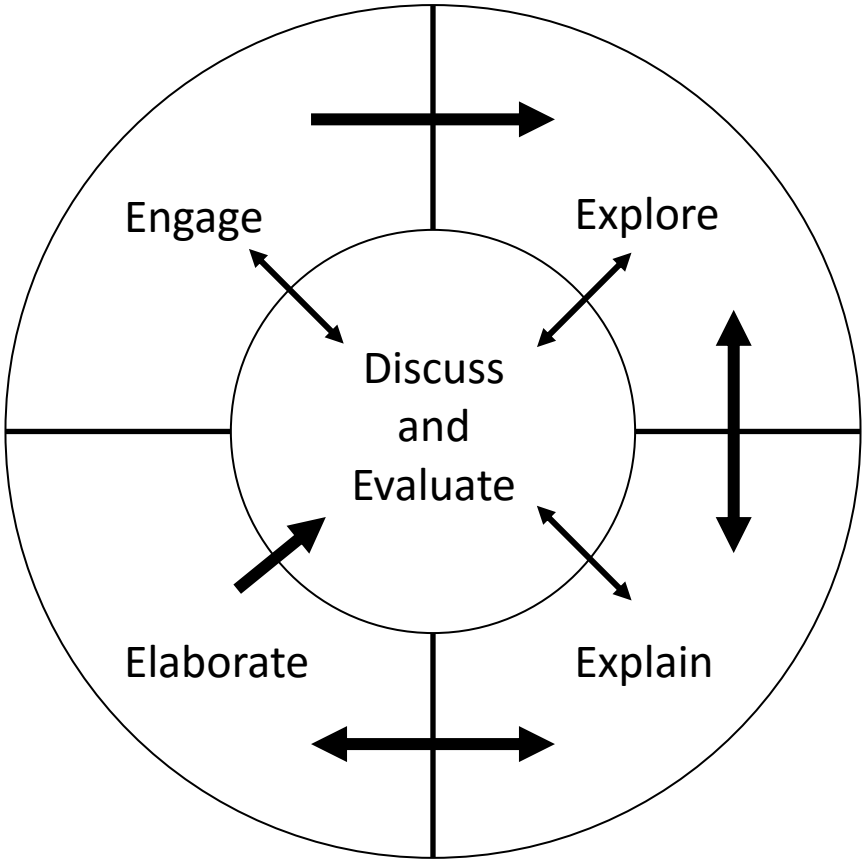
Common Labs: The NSTA recommends that all students experience and participate in at least one hands-on, inquiry-based, lab per week. At least two labs per grading period should have a written lab report with analysis and conclusion. Some of the labs were created in conjunction with the MSP Grant and are written in a 5-E format. Some are found in the **EssentCUAl Science Labs Binder** (ESLB).

CUA : Common Unit Assessments are content-specific tests developed by the district and MSP Grant participants to assist in student progress monitoring. The corollary goal is to prepare students for CCE through similar rigor, complexity, and style guidelines as state assessments.

IA: Interim Assessments (aka Performance Matters) will be utilized 3 times during the school year for progress monitoring as required by the District.

Okeechobee County Science 5E Instructional Model

	Description	Implementation
Engage	Learners engage with an activity that captures their attention, stimulates their thinking, and helps them access prior knowledge. A successful engagement activity will reveal existing misconceptions to the teacher and leave the learner wanting to know more about how the problem or issue relates to his/her own world. *(e.g. ISN-preview, Probe, Teacher Demonstration…)*	The dCUAgram below shows how the elements of the 5E model are interrelated. Although the 5E model can be used in linear order (engage, explore, explain, elaborate and evaluate), the model is most effective when it is used as a cycle of learning.
Explore	Learners explore common, hands-on experiences that help them begin constructing concepts and developing skills related to the learning target. The learner will gather, organize, interpret, analyze and evaluate data. *(e.g. investigations, labs…)*	
Explain	Learners explain through analysis of their exploration so that their understanding is clarified and modified with reflective activities. Learners use science terminology to connect their explanations to the experiences they had in the engage and explore phases. *(e.g. Lecture, ISN-notes, Research, Close-reading, reading to learn, videos, websites…)*	
Elaborate	Learners elaborate and solidify their understanding of the concept and/or apply it to a real world situation resulting in a deeper understanding. Teachers facilitate activities that help the learner correct remaining misconceptions and generalize concepts in a broader context. *(e.g. labs, web-quest, presentations, debate, discussion, ISN-reflection…)*	
Evaluate	Teachers and Learners evaluate proficiency of learning targets, concepts and skills throughout the learning process. Evaluations should occur before activities, to assess prior knowledge, after activities, to assess progress, and after the completion of a unit to assess comprehension. *(i.e. formatives and summatives)*	Each lesson begins with an engagement activity, but evaluation occurs throughout the learning cycle. Teachers should adjust their instruction based on the outcome of the evaluation. In addition, teachers are encouraged to differentCUAte at each state to meet the needs of individual students.



*Adapted from The BSCS 5E Instructional Model: Origins, Effectiveness, and Applications, July 2006, Bybee, et.al, pp. 33-34.

Cognitive Complexity

The benchmarks in the Next **Generation Sunshine State Standards (NGSSS)** identify knowledge and skills students are expected to acquire at each grade level, with the underlying expectation that students also demonstrate critical thinking.

The categories—**low complexity**, **moderate complexity**, **high complexity**—form an ordered description of the demands a test item may make on a student. Instruction in the classroom should match, at a minimum, the complexity level of the learning target in the curriculum map.

Low	Moderate	High
This category relies heavily on the recall and recognition of previously learned concepts and principles. Items typically specify what the student is to do, which is often to carry out some procedure that can be performed mechanically. It is not left to the student to come up with an original method or solution.	This category involves more flexible thinking and choice among alternatives than low complexity items. They require a response that goes beyond the habitual, is not specified, and ordinarily has more than a single step or thought process. The student is expected to decide what to do—using formal methods of reasoning and problem-solving strategies—and to bring together skill and knowledge from various domains.	This category makes heavy demands on student thinking. Students must engage in more abstract reasoning, planning, analysis, judgment, and creative thought. The items require that the student think in an abstract and sophisticated way often involving multiple steps.
Students will: • **retrieve information** from a chart, table, dCUAgram, or graph • **recognize** a standard scientific representation of a simple phenomenon • **complete** a familCUAr single-step procedure or equation using a reference sheet	Students will: • **interpret** data from a chart, table, or simple graph • **determine** the best way to organize or present data from observations, an investigation, or experiment • **describe** examples and non-examples of scientific processes or concepts • **specify** or **explain** relationships among different groups, facts, properties, or varCUAbles • **differentCUAte** structure and functions of different organisms or systems • **predict** or **determine** the logical next step or outcome • **apply** and **use concepts** from a standard scientific model or theory	Students will: • **analyze** data from an investigation or experiment and formulate a conclusion • **develop** a generalization from multiple data sources • **analyze** and **evaluate** an experiment with multiple varCUAbles • **analyze** an investigation or experiment to identify a flaw and propose a method for correcting it • **analyze** a problem, situation, or system and make long-term predictions • **interpret**, **explain,** or **solve** a problem involving complex spatCUAl relationships

*Adapted from Webb's Depth of Knowledge and FLDOE FCAT 2.0 Specification Documentation, Version 2.

Comprehensive Science 3 (Regular and Advanced Curricula)			
Week	**Date**	**Topic(s)**	**Unit CUA**
1 – 2 (10 days)	August 15 – 26 **Unit 1**	Science Processes	**Interim Assessment #1 – August 15-26**
3 – 5 (13.5)	August 29 – September 16 **Unit 2**	Atomic Theory	**Unit 2** Atomic Theory/Periodic Table CUA ~ September 15-16
		Periodic Table of Elements	
6 – 9 (13 Days)	September 19 – October 12 **Unit 3**	Compounds and Mixtures	**Unit 3** Compounds Mixtures CUA ~September 30
		Acids and Bases	Tested on Quarterly Assessment
(2 Days)	October 13 – October 14	Quarterly Review and Test	1st Quarterly Assessment October 13-14
End of 1st 9 Weeks			
10 – 12 (14 Days)	September 17 – November 11 **Unit 4**	Properties of Matter	**Unit 4** Properties of Matter Unit CUA ~ November 18
14 – 16 (15 Days)	November 14 – December 13 **Unit 5**	Matter Cycles	**Unit 5** Matter Cycles PM 2 ~ December 9
(2 Days)	December 14 – December 16	Quarterly Review and Test	2nd Quarterly Assessment December 15-16
End of 2nd 9 Weeks / End of Semester			
17 - 21	January 4 – February 2 **Unit 6**	Universe	**Interim Assessment #2 – January 5-6**
			Unit 6 Universe CUA ~ February 2
22 - 25	February 6 – March 3 **Unit 7**	Solar System	**Unit 7** Solar System CUA ~ March 3
26	March 9 – March 10	Quarterly Review and Test	3rd Quarterly Assessment ~ March 9-10
End of 3rd 9 Weeks			
28 - 30	March 20 – April 7 **Unit 8**	Sun, Earth and Moon	**Unit 8** Sun, Earth and Moon CUA ~ April 7 **Interim Assessment #3**
31-33	April 10 – April 28	SSA Review	SSA Review CUA and/or PM 3 Date TBD
34	May 1 – May 5	SSA Administration	
35-37	May 8 – May 26	Transition to High School	

Unit 1 - The Nature of Science *Nature of Science Standards, NOS Focus, are explicitly applied in content throughout the year.		Weeks 1 - 2	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
The Nature of Science	Students will • **DifferentCUAte** between theories and laws • **Analyze** the methods used to develop a scientific explanation • **Discuss** how scientific theories are different than other theories	SC.8.N.2.2 SC.8.N.2.1 SC.8.N.4.1 SC.8.N.1.5 SC.8.N.3.1	- laws - non-example - theories
	Students will • **DifferentCUAte** between an experiment (control group and varCUAbles) and other types of scientific investigations • **Plan and carry out** various types of scientific investigations and experiments • **Make** predictions to **form** a hypothesis • **DifferentCUAte** between replication and repetition • **Identify** test varCUAbles (independent) and outcome varCUAbles (dependent) • **Identify** control groups for each experiment • **Collect and organize** data • **Interpret** data • **Defend** conclusions	SC.8.N.1.6 SC.8.N.1.1 SC.8.N.1.2	- conclusions - control group - data - differentCUAte - experiment - hypothesis - inference - interpret - investigation - observation - outcome (dependent) varCUAble - prediction - repetition - replication - senses - test varCUAble (independent) - varCUAbles
	Students will • **Use phrases** such as “results support” or “fail to support” • **Explain** why science does not offer conclusive “proof” of a knowledge claim • **Explain how** hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by data	SC.8.N.2.2 SC.8.N.2.2	
		Unit 1 CUA ~ August 26	**August 15 – August 26**

Unit 1 Nature of Science Resources		
Textbook	McGraw Hill Education pp. NOS 4 – NOS 18	
Safari Montage & Other Videos	Steve Spangler's alka seltzer experiment clip – YouTube Making Peace With Lions - YouTube	
Keeley Probes	Volume 2 #14 (Plants in the Dark) Volume 4 #9 (Magnets and Water)	
Websites	Safety Contract - http://www.nsta.org/docs/SafetyInTheScienceClassroom.pdf	
Teacher Hints & Instruction Focus	• Students need to understand that scientists do not only learn from doing investigations but also from reading non-fiction reference materCUAls, such as, journals, newspapers, reference books etc. • Students need to know that scientists gain knowledge from many different methods and use sound scientific reasoning. • The DOE is asking that we no longer have students memorize an artificCUAl number of steps called the scientific method but that students learn scientific reasoning to evaluate whether something is sound or not.	• Have students differentCUAte between **replication and repetition** and why they are important. • Teachers should continue to model limiting varCUAbles and testing a control group for comparison purposes. • Cover the importance of multiple trCUAls and large experimental group. • Students need to understand the importance of researching a topic before forming a hypothesis or conducting an investigation. • Students need to differentCUAte **experiment and investigation.**
Science Best Practices	Measurement processes and lab equipment should be discussed and used during a lab, not in isolation. Teachers should choose a lab that contains an independent and dependent varCUAble, constants, and controls to complete with class during the first two weeks.	
Common Labs, MSP Labs and/or Activities	Four Question Research Strategy From Cothron, Giese, and Rezba, Students and Research, 2000. Alka Seltzer Lab	
Sample Question	Jay and Shanna think their classmates get more schoolwork done before lunch; they suspect that eating lunch makes people less productive. They come up with a six-week-long classroom experiment to test this, which will involve some people having to eat a smaller lunch every other day. What is the FIRST thing they need to do? A. Ask for permission from the parents of their classmates. **B. Divide their class into a control group and a test group.** C. Keep their idea a secret so no one can influence the outcome. D. Tell a few people in class to help them get the outcome they want.	

Unit 2 – Atomic Theory and Periodic Table		Weeks 3 - 5	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

Atomic Theory	**Students will**
	• **recognize** that atoms are the smallest unit of an element
	• **recognize** that atoms are composed of subatomic particles:
	  o Electrons
	  o Neutrons
	  o Protons
	• **create a model** or dCUAgram of an atom (nucleus and subatomic particles)
	  o discuss the benefits and limitations of various atomic models
	  o NOS Focus- benefits and limitations of models
	• **explain** that theories may be modified based on new evidence, but are rarely discarded (in the context of atomic theory)
	  o NOS Focus- Scientific Theories; Technology is essentCUAl to science
		SC.8.P.8.7
		SC.7.N.3.2
		SC.8.N.3.2
		SC.8.E.5.10
			- electrons
			- model
			- neutrons
			- nucleus
			- protons
			- subatomic particle
			- theory
			- technology

	Advanced • **Explain** that electrons, protons and neutrons are parts of the atom and that the nuclei of atoms are composed of protons and neutrons, which experience forces of attraction and repulsion consistent with their charges and masses	**Advanced** SC.912.P.8.4	
Periodic Table of Elements	**Students will** • **recognize** that elements are grouped in the periodic table according to similar properties • **predict** properties of an element using a periodic table when given information about other elements in the same column o NOS Focus- Science is open to change with new evidence	SC.8.P.8.6 SC.6.N.2.2	- columns - families - groups - period - periodic table - properties - rows - trends
	Advanced 1. Use the periodic table and electron configuration to **determine** an element's number of valence electrons and its chemical and physical properties 2. **Explain** how chemical properties depend almost entirely on the configuration of the outer electron shell	**Advanced** SC.912.P.8.5	
	CUA – Atomic Theory and Periodic Table September 15 – September 16 (ERD)	**August 29-September 16 (ERD)**	

Atomic Theory and Periodic Table Resources		
Textbook	**McGraw Hill Education** pp. 234 – 240 (Atomic Theory) pp. 255 – 262 (Periodic Table)	
Safari Montage & Other Videos	**Safari Montage** Schlessinger MedCUA: "Atoms and Molecules," [1:00-22:00], Schlessinger MedCUA: 'The Periodic Table, " 23 minutes	
Keeley Probes	Volume 1 #10 (Is it Matter?) Volume 3 #1 (Pennies) Volume 3 #2 (Is it Solid)	
Websites	http://www.ptable.com/ - Interactive Periodic Table Virtual Build An Atom – Use with worksheet Atomic Structure / twig-world.com - https://www.twigcarolina.com/film/atomic-structure-3509/	
Teacher Hints & Instruction Focus	• Students need to know how particles move in solids, liquids and gases. • Items assessing subatomic particles are limited to protons, neutrons and electrons. • Items will not assess valence electrons or electron configurations or chemical bonding. • Topics are conceptual only; students should not memorize The Periodic Table	• Students will know how elements are grouped in the periodic table according to similar properties. • Items referring to elements are limited to the elements 1-57 and 72-89. • Students will identify how technology is essentCUAl to science. • Teachers with iPads can use the Elements 4D by DAQRI app.
Common Labs, MSP Labs and/or Activities	Introduction to the Periodic Table Lab Virtual Build an Atom (See above)	
Sample Question	**Using a periodic table, determine which of the following pairs of elements would have the most similar properties.** A. hydrogen (H) and helium (He) **B. sodium (Na) and potassium (K)** C. nitrogen (N) and silicon (Si) D. calcium (Ca) and iron (Fe)	

Unit 3 – Compounds and Mixtures		Weeks 6-9	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
Compounds and Mixtures	**Students will** • differentCUAte between atoms, elements, and compounds • explain how elements combine to form compounds that make up all living and nonliving things, for example: ○ atoms share electrons to create a bond between them	SC.8.P.8.5	- atom - attraction - bond - compound - dissolving - element - evaporation - heterogeneous mixture - homogeneous mixture - molecule - pure substance - solution - prediction

	Students will
	• differentCUAte between pure substances, mixtures, and solutions, including:
	  ○ solutions are mixtures that may include multiple states of matter
	• investigate different ways of making and separating mixtures and solutions, including:
	  ○ using a funnel and filter paper, a magnet, dissolving substances, screens, evaporation, etc.
	  ○ NOS Focus: Making predictions; Introduction of varCUAbles
		SC.8.P.8.9
		SC.8.N.1.1	

	Advanced • Write chemical formulas for simple covalent (HCl, SO2, CO2, and CH4), ionic (Na+ + Cl- --> NaCl) and molecular (O2, H2O) compounds • Predict the formulas of ionic compounds based on the number of valence electrons and the charges on the ions	**Advanced:** SC.912.P.8.7	
	Students will • cite common examples of acids, bases, and salts • Investigate to classify various substances using the pH scale as an acid, base, or neutral ○ NOS Focus: Replication vs repetition; Data collection and defend conclusions	SC.8.P.8.8 SC.8.N.1.1 SC.8.N.1.2	
Acids and Bases	**Advanced** • Use experimental data to illustrate and explain the pH scale to characterize acid and base solutions • Compare and contrast the strengths of various common acids and bases	**Advanced:** SC.912.P.8.11	- Acids - Bases - pH - pH Scale salts - replication - repetition (repeated trCUAls)
	Unit 3 Compounds & Mixtures Only CUA – September 30 (Acids & Bases assessed on quarterly assessment) **Review Quarterly Test – October 13- 14**	**September 19 - October 14**	

Unit 3 Compounds and Mixtures / Acids and Bases Resources		
Textbook	**McGraw Hill Education** pp. 299 – 312 pp. 337 – 341 pp. 355-360	
Safari Montage & Other Videos	Safari Montage - Schlessinger MedCUA: "Elements, Compounds, and Mixtures," 33 minutes	
Keeley Probes	Volume 4 #1 (Sugar Water)	
Websites	Study Jams – Acids and Bases - http://studyjams.scholastic.com/studyjams/jams/science/matter/acids-and-bases.htm Color Changing Flowers (Acids & Bases) - http://www.thehappyscientist.com/content/color-changing-flowers	
Teacher Hints & Instruction Focus	• Solutions may use different states of matter, i.e. air is a solution. • Items will not assess types of bonds in terms of ionic, covalent, polar covalent, metallic, hydrogen, and van der waals	• Students need to be able to identify common examples of acids, bases, and or salts. • This is the first time this concept is taught in middle school. • Items assessing acids and bases are limited to pH. • Students should not memorize the specific pH value of substances •
Common Labs, MSP Labs and/or Activities	All the Small Things MSP Lab - http://science4inquiry.com/LP_Elements.php Precipitating Bubbles Lab in EssentCUAl Science Lab Binder (p. 38)	
Sample Test Question	Harriet is looking through the kitchen cabinet, trying to find something with a low pH to use in removing some calcium deposits on the kitchen sink. Which of the following things has the lowest pH and therefore would be best for her to use? A. baking soda B. bleach **C. vinegar** D. water	

Unit 4 – Properties of Matter - Density		Weeks 10-12	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

Physical Properties and Density	**Students will**
	• **classify** substances based on their physical properties, including
	  ○ thermal conductivity, electrical conductivity, solubility, magnetism, melting and boiling points, and density
	• **investigate** to explain how the physical properties of matter are independent of the amount sampled, such as: density and conductivity
	  ○ NOS Focus – Design a controlled experiment
	• **determine** the physical property being analyzed given data from a table
		SC.8.P.8.4
		SC.8.N.1.1
			- boiling point
			- melting point
			- degrees Celsius
			- density
			- electrical conductivity
			- gas
			- liquid
			- magnetic properties
			- mass
			- matter
			- physical properties
			- saturation
			- solid
			- solubility
			- solute
			- solvent
			- thermal conductivity
			- volume
			- weight

	Students will • **calculate** the density of solids, liquids and gases using Density = mass ÷ volume ○ measure the mass and volume of solids, liquids and gases • **sequence** various substances in order of increasing or decreasing density • **differentCUAte** between mass and weight	SC.8.P.8.3 SC.8.P.8.2	
	Advanced • **Discuss** compressibility, malleability, reactivity, and molecular composition • **Describe** simple laboratory techniques that can be used to separate homogeneous and heterogeneous mixtures (filtration, distillation, chromatography, evaporation)	**Advanced:** SC.912.P.8.2	
	Students will • **differentCUAte** between solid, liquid, and gas based on their particle motion • **sequence** the states of matter by increasing or decreasing kinetic energy • **explain** how the state of matter of a substance is related to the average kinetic energy of its molecules • **predict** what happens to the motion of particles during a phase change	SC.8.P.8.1	
	Advanced • **DifferentCUAte** among the four states of matter (solid, liquid, gas and plasma) in terms of energy, particle motion, and phase transitions	**Advanced:** SC.912.P.8.1	- kinetic energy - phase change

Unit 4 Properties of Matter Unit CUA~ November 4	**October 17 – November 11**

Unit 4 Properties of Matter - Density Resources		
Textbook	**McGraw Hill Education** pp. 186-195 NOS Focus – Design a controlled experiment	
Safari Montage & Other Videos	Safari Montage - Schlessinger MedCUA: "Properties of Matter," 23 minutes	
Keeley Probes	Volume 2 #2 (Floating Logs) Volume 2 #3 (Floating High and Low) Volume 2 #1 (Comparing Cubes) Volume 2 #6 (Boiling Time and Temp)	
Websites	Study Jams – Acids and Bases - http://studyjams.scholastic.com/studyjams/jams/science/matter/acids-and-bases.htm Color Changing Flowers (Acids & Bases) - http://www.thehappyscientist.com/content/color-changing-flowers Density – twig-world video - https://www.twigcarolina.com/film/glossary/density-4480/	
Teacher Hints & Instruction Focus	• This is the first time this concept is taught in middle school. • This is a good opportunity to review how to design or evaluate an experiment based on scientific thinking. • Temperature will only be displayed in degrees Celsius. • Students need to know how particles move in solids, liquids, and gases.	• Students may be required to calculate density, if so, the formula would be given. • The middle school curriculum no longer includes chemical properties of matter only physical properties of matter. The textbook goes in depth in both. Do not spend time on chemical properties of matter unless your students have mastered physical properties of matter. • Items may assess the concept of saturation, conductivity, or magnetic properties but no calculations. • Students will not need to know specific melting or boiling points.
Common Labs, MSP Labs and/or Activities	States and Phases of Matter MSP Lab - http://science4inquiry.com/LP_Matter.php Density of Rocks Labs in EssentCUAl Labs Binder p.18 Mass, Volume, Density Lab in EssentCUAl Labs Binder p. 32	
Sample Test Question	Sam is trying to convince Alan that a substance that conducts heat does not necessarily conduct electricity as well. Which of the following would be the best example for him to use to convince Alan of this? **A. a piece of glass** B. a piece of copper wire C. a steel nails D. a paper clip	

Unit 4 – Properties of Matter - Physical & Chemical Changes		Weeks 12-13	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
Properties of Matter Physical & Chemical Changes	Students will • **differentCUAte** physical and chemical changes in matter • **cite examples** of physical and chemical changes in matter • **investigate** physical and chemical changes in matter o NOS Focus – Inferences and Observations	SC.8.P.9.2 SC.8.N.1.1 SC.8.N.1.6	- chemical change - physical change - inference - observation - interpret
	Students will • **explain** how temperature influences chemical changes o NOS Focus – Independent and Dependent VarCUAbles and Control Groups	SC. 8.P.9.3 SC.8.N.1.1 SC7.N.1.4	- Temperature - Independent varCUAble (test - Dependent varCUAble (outcome) - Control groups

	Students will
	• **explain** why mass is conserved when substances undergo physical and chemical changes according to the Law of Conservation of Mass
	  o differentCUAte between a law and a theory
	  o NOS Focus- Theory vs. Law
	• **investigate** the law of conservation of mass using models, such as:
	  • chemical equations, experiments, and demonstrations
	• **design an investigation** to explore the Law of Conservation of Mass
	  • NOS Focus – Hypothesis, Collect and Analyze Data, Draw Conclusions, and Experimental Error
		SC.8.P.9.1
		SC.7.N.3.1
		SC.8.N.1.1
			- Law of Conservation of Mass
			- Scientific Law
			- Scientific Theory
			- Experimental Error

Unit 4 Properties of Matter Physical & Chemical Changes CUA November 18	**November 7 – November 18**

Unit 4 Properties of Matter Physical & Chemical Changes Resources	
Textbook & NOS Focus	**McGraw Hill Education** pp. 199-206 NOS Focus – Inferences and Observations; Independent and Dependent VarCUAbles and Control Groups; Hypothesis, Collect and Anaylze Data, Draw Conclusions, and Experimental Error; Theory vs. Law
Safari Montage & Other Videos	Safari Montage - Schlessinger MedCUA: "Heat and Chemical Energy," 23 minutes
Keeley Probes	Volume 1 #13 (Rusty Nail) Volume 2 #7 (Freezing Ice) Volume 4 #2 (Iron)
Websites	Study Jams – Physical and Chemical Changes of Matter Happy Scientist – Making Butter Physical and Chemical Changes - YouTube
Teacher Hints & Instruction Focus	• This is the first time this concept is taught in middle school. • Students will not be assessed on balancing chemical equations. • The Law of Conservation of Mass will not require mathematical computations
Common Labs, MSP Labs and/or Activities	Maintaining Mass MSP Workshop - http:/science4inquiry.com/LP_Mass.php
Sample Test Question	Hilary put some ice cubes in a glass of water, and the ice cubes melted. What is the best evidence she can use to show that the melting of the ice is a purely physical change and not a chemical change? A. Even though the ice and the liquid water look different, they can be shown to be made of the same molecules. **B. When liquid water is put into the freezer and cooled long enough, it will change into a solid form.** C. She did not need to add any extra heat in order to get the ice to melt in the glass of water. D. Although ice is more difficult to see through than liquid water, it does not change color when it melts

Unit 5 Matter Cycles – Photosynthesis and Cellular Respiration		Weeks 14-15	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

Photosynthesis	Students will
	• **describe** the process of photosynthesis using word equations:
	  • carbon dioxide + water + sunlight —> sugar (food) + oxygen + water
	• **describe** the role of light, carbon dioxide and water in photosynthesis
	• **describe** the role of chlorophyll in the process of photosynthesis
	• **differentCUAte** which organisms undergo photosynthesis
	  • NOS Focus- Making predictions and using evidence to draw conclusions
	• **create** a model of the greenhouse effect
		SC.8.L.18.1
		SC.8.N.1.6
			- chlorophyll
			- chloroplasts
			- organism
			- photosynthesis

Cellular Respiration	Students will • **describe** the process of cellular respiration using word equations: • oxygen + sugar (food) — > carbon dioxide + water • **explain** how cellular respiration breaks down food to provide energy and releases carbon dioxide • **explain** why plants and animals undergo cellular respiration	SC.8.L.18.2	- cellular respiration - mitochondrCUA
Advanced	Advanced • **Identify** the reactants, products, and basic functions of photosynthesis • **Identify** the reactants, products, and basic functions of aerobic and anaerobic cellular respiration • **Explain** the interrelated nature of photosynthesis and cellular respiration	Advanced: SC.912.L.18.7 SC.912.L.18.8 SC.912.L.18.9	
	Unit 5 Matter Cycles CUA – December 9	**November 28 – December 9**	

Unit 5 Matter Cycles – Photosynthesis and Cellular Respiration Resources	
Textbook	**McGraw Hill Education** pp. 419-423 NOS Focus- Making predictions and using evidence to draw conclusions.
Safari Montage & Other Videos	Safari Montage - "Photosynthesis," 23 minutes, "Respiration" – Bill Nye [10:10, 16:10, 17:30] Twig-world.com - Photosynthesis
Keeley Probes	Volume 1 #20 (Functions of Living Things)
Websites	The Happy Scientist – Cellular Respiration The Happy Scientist - Photosynthesis
Teacher Hints & Instruction Focus	• This is the first time this concept is taught in middle school. • Items will not assess anaerobic respiration. • Items will not use the form ATP. • Items will not use term reactant. • Students should not memorize the full formulas for these processes but should know the **products and reactants** as words.
Common Labs, MSP Labs and/or Activities	Photosynthesis Lab MSP Grant - http://science4inquiry.com/LessonPlans/LifeScience/Photosynthesis_1/YinYangPhotosynthesis.pdf Modeling the Greenhouse Effect – EssentCUAl Lab Binder p. 46
Sample Test Question	Which of the following best explains what happens to most of the heat generated when food molecules are broken down in the body during cellular respiration? **A. It is released to the surrounding environment.** B. It is used to power the body's processes. C. It is destroyed as it is used by the body for fuel. D. It is converted into fat and stored for later use.

Unit 5 – Matter Cycles – Conservation of Matter and Energy		Weeks 14-15	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

Conservation of Matter and Energy	Students will
	
	• investigate how living systems obey the Law of Conservation of Mass
	  • NOS Focus – Design a controlled Experiment
	
	• investigate how living systems obey the Law of Conservation of Energy
	  • NOS Focus – Interpreting data and developing a hypothesis
		SC.8.L.18.4	- Law of Conservation of Energy
			
			- Law of Conservation of Mass

	Students will • explain how matter and energy are transferred in the carbon cycle • construct a scientific model of the carbon cycle • NOS Focus- Discuss benefits and limitations of models • identify carbon reservoirs as the atmosphere, organisms, fossil fuels, sediments and oceans and other bodies of water	SC.8.L.18.3 SC.7.N.3.2	- Biomass - carbon cycle - carbon - reservoirs - environment - fossil fuels - sediments
	Unit 5 Matter Cycles – Conservation of Matter and Energy CUA December 9 **Quarterly Test Review December 12 – 14 & Test December 15-16**	**November 28 –December 9** **December 12 – December 16**	

Unit 5 – Matter Cycles – Conservation of Matter and Energy	
Textbook	**McGraw Hill Education** pp. 252-259 NOS Focus- Design a controlled experiments; Interpreting data and developing a hypothesis; Limitations and benefits of scientific models
Safari Montage & Other Videos	Safari Montage - "The Transfer of Energy," 24 minutes
Keeley Probes	Volume 1 #8 (Seedlings in a Jar) Volume 3 #19 (Earth's Mass)
Websites	Study Jam – The Carbon Cycle
Teacher Hints & Instruction Focus	Items referring to the carbon cycle may include carbon reservoirs, such as the atmosphere, organisms, fossil fuels, sediments, and oceans/water.
Common Labs, MSP Labs and/or Activities	Carbon and Climate MSP 5E Lab http://science4inquiry.com/LessonPlans/EarthScience/Carbon/CarbonWarmingS4ILessonFinal.pdf
Sample Test Question	The average person eats tons of food during their life, yet an adult only weighs, at most, a few hundred pounds. Which answer best explains what happens to all of that food? A. Some is used to build body structures, and some disappears while being transported. **B. Some is used for growth, some may be stored, and some is excreted as waste.** C. Some is used for energy for the body, some may be stored, and some disappears. D. Some evaporates during the digestion process, and some gets used by the body.

Unit 6 – Scale of the Universe and Gravity		Weeks 17 -18	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

Electromagnetic Spectrum	Students will
	• **identify** the electromagnetic waves from the Sun, such as
	  • infrared, visible light and ultraviolet
	• **sequence** the order of frequencies and wavelengths in the electromagnetic spectrum (radio to gamma)
	• **identify** common uses and applications of electromagnetic waves, such as
	  • satellite photographs, microscopes, laser devices, etc.
	• **discuss** the importance of technology in studying various aspects of space
		SC.8.E.5.11
		
		SC.8.E.5.10
			- Electromagnetic spectrum
			- Electromagnetic waves / radCUAtion
			- visible light
			- frequency
			- infrared light
			- ultraviolet light
			- satellite photographs
			- wavelength

Scale of the Universe and Gravity	Students will • **distinguish** the hierarchical relationships between planets, stars, moons, asteroids, nebulae, galaxies, dwarf planets and comets in the universe by comparing distance, relative size, and general composition	SC.8.E.5.3	- relative size - relative distance - composition - astronomical bodies
	Students will • **describe** the distances (in astronomical units and light years) between objects in space in the context of light and space travel	SC.8.E.5.1	- light years - astronomical units (AU)
	Students will • **recognize** that the universe contains billions of galaxies and stars	SC.8.E.5.2	- universe - space

	Students will
	• **describe** the role gravity plays in the formation of planets, stars, and the solar system (Law of Universal Gravitation)
	• **differentCUAte** between weight and mass, such as
	  • weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass
	• **apply** the Law of Universal Gravitation to objects in space in terms of orbital path, weight, speed, etc.
	  • NOS Focus- Scientific Processes with observations and inferences
		SC.8.E.5.4
		
		SC.8.P.8.2
		
		SC.8.N.1.1
			- gravity
			- weight
			- mass
			- gravitational pull
			- force

Unit 6 Scale EM Spectrum Universe & Gravity CUA January 20	**January 4 – January 20**

Unit 6 Scale EM Spectrum Universe & Gravity Resources	
Textbook and NOS Focus	**McGraw Hill Education** Text: Pp. 94-107 NOS Focus- Scientific Processes with observations and inferences.
Safari Montage & Other Videos	EM Spectrum – YouTube Star Size Comparison – YouTube
Keeley Probes	Volume 1 #3 (Birthday Candles), Volume 1 #13 (Gravity) Volume 4 #8 (Standing on One Foot)
Websites	Electromagnetic Spectrum – Twig World (2:47) Electromagnetic Spectrum 2 – Twig World (:48) What Makes Up the Electromagnetic Spectrum – Twig World (3:08) Forces of Nature – Twig World (3:24) Scale of the Universe - cPalms
Teacher Hints & Instruction Focus	• Items will not address hazards of electromagnetic radCUAtion. • Energy and the electromagnetic spectrum are conceptual only. • The formula for the Law of Universal Gravitation or the gravitational constant is not required. • Students should not memorize quantitative astronomical data. • Items will not assess the relative distance of objects in our solar system from the Sun • Students do not need to know chemical composition of solar bodies. • Items assessing astronomical bodies are limited to planets, stars, moons, asteroids, nebulae, galaxies, dwarf planets, and comets. • Items will not require calculations but may require comparison or use of quantitative data including tables. • Items addressing mass or weight will not assess units of measure of mass and weight.
Common Labs, MSP Labs and/or Activities	Gravity Force Lab - https://phet.colorado.edu/en/simulation/gravity-force-lab Expanding the Universe – MSP lab
Sample Test Question	One type of light that comes from the Sun is called infrared. Human eyes can't see this type of light, but specCUAlly built cameras can. Why can't human eyes detect infrared light? A. The energy of infrared light is too high for our eyes to detect. **B. The wavelength of infrared light is too long for our eyes to detect.** C. Infrared light is too fast for our eyes to detect. D. The Sun does not give off enough infrared light for our eyes to detect.

Unit 6 – Scale of the Universe and Gravity – Sun and Other Stars		Weeks 17-21	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
The Stars and Our Sun	Students will • **describe** the physical properties of main sequence stars, including • apparent brightness (magnitude), temperature (color), size, and absolute brightness (magnitude) • **understand** how technology is essentCUAl to science for such purposes as access to outer space and other remote locations, sample collections, measurement, data collection and storage, computation, and communication of information.	SC.8.E.5.5 SC.8.E.5.10	- absolute brightness - apparent magnitude - physical properties - temperature
	Students will • **describe** the properties and characteristics of the Sun, including: o rotation, structure, convection, sunspots, solar flares, and prominences • **create** models of various solar phenomena o NOS Focus- identify the benefits and limitations of the use of scientific models	SC.8.E.5.6 SC.8.N.3.1 SC.7.N.3.2	- convection - rotation solar - flares - solar prominences - solar properties - sun - sunspots
	Advanced 1. Describe the physical properties of the Sun (sunspot cycles, solar flares, prominences, layers of the Sun, coronal mass ejections, and nuclear reactions) and the impact of the Sun as the main source of external energy for the Earth	**Advanced** SC.912.E.5.4	

Unit 6 – Scale of the Universe and Gravity & The Stars and Our Sun ~ CUA February 2	**January 4 – February 2**

Unit 6 – Scale of the Universe and Gravity / The Stars and Our Sun Resources		
Textbook and NOS Focus	**McGraw Hill Education** Text: Pp. 102 – 109 NOS Focus- Technology to study outer space; Benefits and limitations of scientific models	
Safari Montage & Other Videos	Safari Montage - "Planets and Solar System," 24 minutes. The Sun – Twig World (1:34) Sun – Twig World (:54) What are Stars – Twig World (3:13) Star – Twig World (:41)	
Keeley Probes	Volume 4 #23 (Moonlight)	
Websites	www.nasa.gov H-R DCUAgram Explorer	
Teacher Hints & Instruction Focus	• This is the first time this concept is taught in middle school. • Items will not assess the stages of stellar evolution. • Students will not need to know specific chemical composition of the stars. • Stellar distance will be given in AU or light years.	• Items will focus on main sequence stars and their properties. • Absolute brightness should be used instead of absolute luminosity. • Models may be 2D, 3D, computer generated, dCUAgrams etc. • Interpret models of solar properties including rotation, structure, convection, sunspots, solar flares and prominences. Students on FCAT will not be able to create a model of solar properties but they will be expected to evaluate models that they are given and explain their solar characteristics.
Common Labs, MSP Labs and/or Activities	Star Scatter Plots - cPalms	
Sample Test Question	Sunspots are dark regions on the visible surface of the Sun. Which of the following is responsible for sunspots? A. fusion reactions in the Sun B. gravitational force between Earth and the Sun **C. the Sun's magnetic field** D. solar flares	

Unit 7 – Solar System		Weeks 22-25	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**

The Solar System	Students will
	
	• **differentCUAte** between the various historical models of the solar system, including geocentric and heliocentric
	  ○ NOS Focus- theories may be modified but are rarely discarded
	
	• **create** a model of the solar system
	  ○ NOS Focus-using models to make sense of the collected evidence
	  ○ NOS Focus- scientific knowledge changes with new evidence
		SC.8.E.5.8
		
		SC.8.N.3.2
		
		SC.8.N.1.6
		SC.7.N.2.1
			- geocentric
			- heliocentric

	Students will
	
	• **differentCUAte** between characteristics of objects in the solar system (including the sun, planets and their moons) with Earth in terms of
	  ○ gravitational force, distance from the Sun, speed, movement, orbital path, temperature, and atmospheric conditions
	
	• **explain** how surface temperature and length of year of a planet are related to the distance from the sun
	
	• **compare** the atmospheres of the planets to the atmosphere of Earth in terms of surface temperature, including
	  ○ presence, absence, or relative thickness
		SC.8.E.5.7	- Atmospheric conditions
			- Earth
			- gravitational force
			- moon
			- motion
			- orbital path
			- planets
			- solar system
			- speed

	Solar System Unit CUA ~ March 3 **3rd Quarterly Assessment ~ March 8-9**	**February 6 – March 9**	

Solar System Resources	
Textbook	**McGraw Hill Education** Text: Pp. 50-83 NOS Focus- Modification of theories , Collection of scientific evidence, Science changes with evidence
Safari Montage & Other Videos	Safari Montage - "Renaissance Science & Investigation: Geo vs. Helio" [6:30-11:10] Birth of Our Solar System – Twig World (2:59) Planet – Twig World (1:06) Elliptical Orbit – Twig World (:43) TerrestrCUAl Planets – Twig World (:53)
Keeley Probes	Volume 4 #22 (Where would it Fall)
Websites	www.nasa.gov
Teacher Hints & Instruction Focus	• This is the first time this concept is taught in middle school. • Items will not assess the chemical composition of the atmospheres. • Items will not assess the order of the planets in the Solar System in isolation but that knowledge may help them answer a conceptual question about how their characteristics are different from Earth.
Common Labs, MSP Labs and/or Activities	Temperature of the Inner Planets – MSP lab
Sample Test Question	Saturn is 9.5 astronomical units (AU) from the Sun and Mars is only 1.5 AU from the Sun. Saturn is also much larger than Mars. Based on this information, how does the average surface temperature on Mars compare to the average surface temperature on Saturn? **A. Since Mars is closer to the Sun than Saturn, it has a higher average surface temperature.** B. Saturn is larger than Mars and absorbs more light, so it has a higher average surface temperature. C. Since both planets are more than 1 AU from the Sun, their average surface temperatures are equal. D. Even though Saturn is further away, Saturn's rings cause it to have a lower average surface temperature.

Unit 8: The Solar System		Weeks 22-25	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
Relationships between Sun, Moon, and Earth	Students will • **demonstrate** the effects of Earth's rotation and revolution in relationship to the sun, such as ○ day and night vs. length of a year • **dCUAgram** to explain how Earth's tilted axis and its revolution around the Sun produces seasons • **explain** how the Earth stays in orbit because of its inertCUA and the gravitational pull of the sun	SC.8.E.5.9.1	- rotation - revolution - day / night - year - axis - seasons - gravitational attraction - inertCUA
	Students will • **demonstrate** to explain how the phases of the moon are created • **explain** how the tides are the result of the pull of gravity by the Sun and Moon • **differentCUAte** between solar and lunar eclipses	SC.8.E.5.9.2	- moon phases - tides - solar eclipses - lunar eclipses
	Students will • **discuss** the effects of space exploration on the economy and culture of Florida • **explain** how political, socCUAl, and economic concerns can affect science, and vice versa at the levels of community, state, national, and international levels		
	Relationships between Sun, Earth, and Moon Unit CUA ~ April 7	**March 20 – April 7**	

Relationships between Sun, Earth, and Moon & Density Resources	
Textbook	**McGraw Hill Education** Text: Pp 10-39
Safari Montage & Other Videos	Safari Montage - Sun, Earth, Moon – [23:58] Safari Montage – Bill Nye: The Moon – [21:53] Safari Montage – Bill Nye: The Sun – [19:22]
Keeley Probes	Volume 1 #25 (Going through a Phase) Volume 3 #23 (Summer Talk) Volume 4 #24 (Lunar Eclipse) Volume 4 #25 (Solar Eclipse)
Websites	Day and Night – Twig World (2:00) What are Eclipses – Twig World (3:13) Moon and Spring Tides – Twig World (2:43)
Teacher Hints & Instruction Focus	• Items on eclipses will not assess umbra or penumbra.
Common Labs, MSP Labs and/or Activities	Phases of the Moon – MSP Lab
Sample Test Question	Which of the following statements correctly explains why we experience seasons? A. As the Earth moves away from the Sun, we change from summer to fall to winter. As the Earth moves closer to the Sun, we change from winter to spring to summer. B. As the Earth spins on its axis, we experience seasons. Each 1/4 spin of the Earth on its axis represents a change in season. **C. Earth's tilt on its axis means one hemisphere leans toward the Sun, causing it to experience warmer temperatures. As Earth revolves around the Sun, a different hemisphere leans toward the Sun, causes warmer temperatures in that hemisphere.** D. The Moon moving in front of the Sun causes temperatures on Earth to drop, which causes winter. When it moves behind the Sun, a rise in temperature causes summer.

SSA (formerly known as FCAT) Review and Administration		Weeks 31-34	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
SSA Review and Administration	SSA Review and Administration Instruction Driven By Data		
	SSA Review Unit CUA – Date TBD SSA Administration - TBD	**April 10 – April 28**	

SSA (formerly known as FCAT) Review and Administration		
Textbook		
Safari Montage & Other Videos		
Keeley Probes		
Websites		
Teacher Hints & Instruction Focus		
Common Labs, MSP Labs and/or Activities		
Sample Test Question		

Transition into High School		Weeks 31-34	
Topics	**Learning Targets and Skills**	**Standards**	**Vocabulary**
SSA Review and Administration	Units can be chosen by teachers.		

Transition into High School		
Textbook		
Safari Montage & Other Videos		
Keeley Probes		
Websites		
Teacher Hints & Instruction Focus		
Common Labs, MSP Labs and/or Activities		
Sample Test Question		