St. Johns County School District
2013-2014 School Year
Course: 2002110

Advanced 8th Grade Science

Curriculum Map Terms and Use

Text: Pearson Interactive Science Course 3. Supplement with additional materials.

Quarter: Refers to the time period during which the standard(s) should be taught.

Unit/Organizing Strand: The overarching organizational structure used to group content and concepts within the map.

Common Core Standards for Math and Literacy: Are to be incorporated into instruction, see notes in the map for suggestions. Best practice is to provide time for close reading and analytical writing, pushing student to evaluate/analyze information. **For direct correlation of the standards to the standards within the map, visit:** http://www.cpalms.org/

Essential Questions: Overarching question(s) that will serve to guide instruction and to push the student to higher levels of thinking (critical thinking). These questions should guide students to the heart of the content.

Benchmark: Refers to the benchmark classification system number: subject area, grade level, body of knowledge, big idea and benchmark are given in the benchmark. **Ex: SC.912.P.12.1**

Standard: The knowledge that the student is expected to acquired.

Student Tasks: Expected behavior that the student will demonstrate if they have acquired the knowledge from the standard.

Key Terms: Students should demonstrate fluency in vocabulary that is intrinsic to the course.

Content Limits: When given, these explain limitations on the standard that will be tested on a state EOC or FCAT.

Highlighted item: DOE indicates that this will be tested on the 8th grade FCAT 2.0 Science Exam.

SC.912.P… These are your advanced standards, they are NOT FCAT tested items. The remarks are state clarification statements for the standard.

Resources and Activities: Are suggested. Best practice is to provide inquiry and/or follow up labs or activities, non-fiction text and/or enrichment activities **for** foundational or important topics. Standards that are foundational to future middle or high school required courses have comments listed beneath the standard**. . For resources on CPALMS, visit:** www.cpalms.org

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter:** 1 and all throughout the year	**Pacing:** approximately 1.5-2 weeks for "N" standards
Unit/Organizing Strand: The Practice of Science, Characteristics of Scientific Knowledge			
Essential Question(s): Why is it important to control conditions and focus on a single variable in an experiment? How can you be sure that the data in an experiment answers your question?			

Benchmark and Student Task	**Standard**	**Resources and Activities**
SC.8.N.1.1 **Also assesses SC.8.N.1.3 and 1.4** **Also assesses SC.6.N.1.1, SC.6.N.1.3, SC.7.N.1.1, SC.7.N.1.3, SC.7.N.1.4.** **SC.8.N.1.2** **Assessed as SC.7.N.1.2** **SC.8.N.2.2** **Not FCAT assessed.** **SC.8.N.1.6** **Assessed as SC.6.N.2.2** **SC.8.N.1.5** **Assessed as SC.7.N.1.5** **SC.8.N.1.3** **Assessed as SC.8.N.1.1**	Define a problem from the 8th grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations 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. Design and conduct a study using repeated trials and replication Discuss what characterizes science and its methods. Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of collected evidence. Analyze the methods used to develop a scientific explanation as seen in different fields of science Use phrases such as "results support" or "fail to support" in science understanding that science does not offer conclusive proof of a knowledge claim. **Teach them, but, "N" standards <u>on this page</u> will not be tested until midterm.**	**Media Resource:** **BozemanScience.com**: • Scientific Method • Asking Questions and Designing Problems • Planning and Carrying Out Investigations • Obtaining, Evaluating and Communicating Information

Course# 2002110	**Course : 8th Grade Science Advanced**	**Quarter:** 1 and all throughout the year	**Pacing: Integrate throughout the year**
Unit/Organizing Strand: Language Arts and Math Standards for Reading/Writing from Common Core			

Benchmarks and Student Task:	**Standard**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they're used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (eg. in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4.10	By end of grade 8, read and comprehend science/technical text in the grade 6-8 text complexity band independently and proficiently.
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. • Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (headings) graphics (charts, tables) and multimedia when useful to aid comprehension • Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples • Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts • Use precise language and domain specific vocabulary to inform about or explain the topic • Establish and maintain a formal style and objective tone
LACC.68.WHST.3.9	Draw evidence from informational text to support analysis, reflection and research.
MACC.8.F.2.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter:** 1 and all throughout the year.	**Pacing:**
Unit/Organizing Strand: Matter, Characteristics of Matter			

Benchmarks/Student Task	**Standards**	**Resources and Activities**
SC.8.P.8.4 **Also assesses SC.8.P.8.**	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured: for example: density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.	**Media :** BozemanScience.com: • Matter • States of Matter • Properties of Matter **Simulation:** http://phet.colorado.edu/ • States of Matter
SC.8.P.8.3 **Assessed as SC.8.P.8.4**	Explore and describe the densities of various materials through measurement of their masses and volumes.	
SC.8.P.8.2 **Assessed as SC.6.P.13.1**	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.	
SC.8.P.8.1 **Assessed as SC.8.P.8.5**	Explore the scientific theory of atoms (also known as the atomic theory) by using models to explain the motion of particles in solids, liquids and gases.	
SC.912.P.8.1	Differentiate among the 4 states of matter. Remarks: Differentiate among the 4 states of matter in terms of energy, particle motion and phase transitions.	

Course# 2002110 2002100	**Course: 8th Grade Science Advanced**	**Quarter: 1**	**Pacing:**
Unit/Organizing Strand: Properties of Matter, The Practice of Science, The Role of Laws, Theories, Hypothesis, and Models			
Essential Question(s): How are physical and chemical properties of substances related to their atomic and molecular structure? How do atoms form chemical bonds to acquire stability via electron arrangement? How is the PTE used to describe physical/chemical characteristic of elements? What differentiates 1 element from another?			

Benchmarks and Student Tasks	**Standards:**	**Resources and Activities**
SC.8.P.8.7 **Assessed as SC.8.P.8.5**	Explore the scientific theory of atoms (also known as the atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).	**Media Resource:** **BozemanScience.com:** • The History of the Atom • Developing and Using Models
SC.8.N.1.4 **Assessed as SC.8.N.1.1**	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data	
SC.8.N.3.1 **Not FCAT assessed.**	Select models useful in relating the results of their own investigations.	
SC.8.N.3.2 **Assessed as SC.7.N.3.1**	Explain why theories may be modified but are rarely discarded.	**Writing prompts:** in the MS Writing folder on Science teacher's conference. • Atoms-Cells • Weight-mass
SC.912.P.8.4	Explore the atomic theory (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons, electrons and differentiate among the particles in terms of mass, charge and locations within the atom. Remarks: 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.	
	END OF QUARTER 1	

Course# 2002110	Course: 8th Grade Science Advanced	Quarter: 2	Pacing:
Unit/Organizing Strand: The Properties of Matter			
Essential Question(s): What makes one element different from another? How can all of forms of matter be made up of about 100 or so different elements? How do the properties of matter differ dependent on the type of bond/compound formed?			
Benchmarks and Student Tasks	**Standards**		**Resources and Activities**
SC.8.P.8.6 **Assessed as SC.8.P.8.5** **SC.912.P.8.5** **SC.8.P.8.5** **Also assesses SC.8.P.8.1, SC.8.P.8.6, SC.8.P.8.7, SC.8.P.8.8, SC.8.P.8.9** **SC.912.P.8.7** **SC.8.P.9.2** **Also assesses SC.8.P.9.1 and SC.8.P.9.3**	Recognize that elements are grouped in the periodic table according to similarities of their properties. Relate properties of atoms and their position in the PTE to the arrangement of their electrons. Remarks: Use the periodic table and electron configuration to determine an element's number of valence electrons and its chemical and physical properties. Explain how chemical properties depend almost entirely on the configuration of the outer electron shell. Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter. Interpret formula representations of molecules and compounds in terms of composition and structure. Remarks: Write chemical formulas for simple covalent (HCl, CO_2) ionic $Na^+ + Cl^- \rightarrow NaCl$) and molecular ($O_2$, H_2O) compounds. Predict formulas of ionic compounds based on the number of valence electrons and the charges on the ions. Differentiate between physical changes and chemical changes. **(Include Change of State with Physical Changes)**		**Resources:** **Media:** **BozemanScience.com:** • Atoms and the Periodic Table • Tour of the Periodic Table **Articles:** are in MS Articles (conference). • Elements-Atoms-diamonds **Simulation:** **http://phet.colorado.edu/** • Build an Atom

Course# 2002110	Course: 8th Grade Science Advanced	Quarter: 2	Pacing:
Unit/Organizing Strand: The Properties of Matter, Changes in Matter			
Essential Question(s): How do chemical or physical changes effect the energy of a system? How are chemical changes different from physical changes in matter?			

Benchmarks and Student Tasks	Standards	Resources and Activities
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes in matter. Remarks: Discuss volume, compressibility, density, conductivity, reactivity, freezing, melting, and boiling points. Describe simple lab techniques that can be used to separate homo/heterogeneous mixtures (filtration, distillation, evaporation).	**Media:** **BozemanScience.com:** • Physical and Chemical Changes **Activity:** • Write about the physical and chemical changes that occur when a wax candle burns. Explain how you decided to classify each.
SC.8.P.9.1 **Assessed as SC.8.P.9.2**	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.	
SC.8.P.9.3 **Assessed as SC.8.P.9.2**	Investigate and describe how temperature influences chemical changes.	
SC.8.P.8.9 **Assessed as SC.8.P.8.5**	Distinguish among mixtures (including solutions) and pure substances.	
SC.8.P.8.8 **Assessed as SC.8.P.8.5**	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.	
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH. Remarks: 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. **END OF QUARTER 2**	

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter: 3**	**Pacing:**
Unit/Organizing Strand: Matter and Energy Transformations			
Essential Question(s): What everyday situations illustrate energy transformation? How does energy transfer demonstrate the Law of Conservation of Energy? Why are cycles invaluable to sustaining life? What is the outcome of energy flow in our environment?			

Benchmarks and Student Tasks:	**Standards**	**Resources and Activities**
SC.8.L.18.4 **Also assesses SC.8.L.18.1, SC.8.L.18.2, SC.8.L.18.3.** **SC.8.L.18.3** **Assessed as SC.8.L.18.4.** **SC.8.L.18.1** **Standards SC.8.L.18.1 and 18.2 are critical standards for students who will take HS Biology. Assessed as SC.8.L.18.4.** **SC.8.L.18.2** **Standards SC.8.L.18.1 and 18.2 are critical standards for students who will take HS Biology. Assessed as SC.8.L.18.4.** **SC.912.L.18.7** **SC.912.L.18.8** **SC.912.L.18.9**	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy. Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environments. Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll, production of food, release of oxygen. Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide. 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.	**Articles:** are in MS Articles (conference). • Biogeochemical cycles **Writing:** Is in MS Writing folder on Science conference • Photosynthesis • Chlorophyll **Media:** **BozemanScience.com:** • Photosynthesis • Cellular Respiration **www.NBClearn.com:** • Chemistry Now: The Chemistry of Green: Chlorophyll **Simulation:** http://www.johnkyrk.com/photosynthesis.html • Photosynthesis

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter: 3**	**Pacing:**
Unit/Organizing Strand: Earth in Space and Time			
Essential Question(s): What does our universe contain and how have we learned about it?			
Benchmarks/Standards:	**Target: The student will…**		**Resources and Activities**
SC.8.E.5.1 **Assessed as SC.8.E.5.3** **SC.8.E.5.2** **Assessed as SC.8.E.5.3** **SC.8.E.5.3** **Also assesses SC.8.E.5.1 and 5.2**	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance. Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size and composition.		**Articles:** are in MS Articles (conference). • Stars • Space-White Dwarfs **Writing:** • Are there galaxies other than the Milky Way that can be seen with the unaided eye? explain, justify, and cite facts. **Writing:** • What is the difference between the universe and the observable universe? **Media:** **www.NBClearn.com:** Science Behind the News: Impacts on Jupiter

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter: 3**	**Pacing:**
Unit/Organizing Strand: Earth in Space and Time			
Essential Question(s): What does our universe contain and how have we learned about it? How is it possible that objects far from us have such an impact on us?			
Benchmarks/Standards:	**Target: The student will…**		**Resources and Activities**
SC.8.E.5.4 **Assessed as SC.8.E.5.7** **SC.8.E.5.5** **Also assesses SC.8.E.5.6** **SC.8.E.5.6** **Assessed as SC.8.E.5.5**	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and the solar systems and in determining their motions. Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness). Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences. **END QUARTER 3**		**Media:** http://science360.gov • Birth of a Planet

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter:** 4	**Pacing:**
Unit/Organizing Strand: Earth in Space and Time			
Essential Question(s): What is gravity's role on our changing seasons/tides? How is it possible that objects far from us have such an impact on us? Why is the sun our most important star?			

Benchmarks/Standards:	**Target: The student will…**	**Resources and Activities**
SC.8.E.5.7 **Also assesses SC.8.E.5.4 and SC.8.E.5.8**	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.	**Articles:** are in MS Articles (conference). • Stars • Space-White Dwarfs
SC.8.E.5.9	Explain the impact of objects in space on each other including: the Sun on the Earth including seasons and gravitational attraction and the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.	**Writing:** • Are there galaxies other than the Milky Way that can be seen with the unaided eye? explain, justify and site facts • What is the difference between the universe and the observable universe?
SC.8.E.5.8 **Assessed as SC.8.E.5.7**	Compare various historical models of the Solar System, including geocentric and heliocentric.	**Media:** http://science.discovery.com • The Sun • Solar system **Simulations:** http://www.jgiesen.de/GeoAstro/GeoAstro.htm

Course# 2002110	**Course: 8th Grade Science Advanced**	**Quarter: 4**	**Pacing:**
Unit/Organizing Strand: Earth in Space and Time, Characteristics of Scientific Knowledge			
Essential Question(s): How is technology important to further of our knowledge of the universe?			
Benchmarks/Standards:	**Target: The student will…**		**Resources and Activities**
SC.8.E.5.10 **Assessed as SC.7.N.1.5**	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, communication of information.		**Articles:** are in MS Articles (conference). • Edwin Hubble
SC.8.E.5.11 **Assessed as SC.7.P.10.1**	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.		**Writing:** • Write a paragraph arguing for or against the advancement of technology, using at least 3 examples that support your point.
SC.8.N.2.1 **Not assessed on FCAT.**	Distinguish between scientific and pseudoscientific ideas.		**Writing:** • Predict how our oceans would be affected if gravitational pull on us from the moon were to lessen.

Course# 2002110	**Course:** 8th **Grade Science Advanced**	**Quarter:** 4	**Pacing:**
Unit/Organizing Strand: Earth in Space and Time **,** Science and Society			
Essential Question(s): What is the impact of science on our culture, society, economy?			
Benchmarks/Standards:	**Target: The student will…**		**Resources /Activities**
SC.8.E.5.12 **Not FCAT assessed.** **SC.8.N.4.1** **Not FCAT assessed.** **SC.8.N.4.2** **Not FCAT assessed.**	Summarize the effects of space exploration on the economy and culture of Florida. Explain that science is one of the processes that can be used to inform decision making at the community, state, national and international levels. Explain how political, social and economic concerns can affect science and vice versa. **END SEMESTER 2**		**Media:** http://bigthink.com Bill Nye: • Why We Explore