

| UNIT/ORGANIZING PRINCIPLE: The Nature of Science | | Pacing: August-June <i>*These benchmarks should be integrated throughout the course</i> First 9 weeks: Weeks 1-5 | | |
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| Essential Question(s): 1. What are the characteristics of science? 2. How do scientists develop explanations? 3. How do scientists discover things? 4. How do scientists show the results of investigations? 5. How do science and society work together? | | | | <u>*Big Idea 1:</u> The Practice of Science |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| The Practice of Science These benchmarks are very important for the students to understand because they explain how the scientific world really | <ul style="list-style-type: none"> • define a problem from the eighth grade curriculum, use 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. • use phrases such as “results support” or “fail to support” in science, understanding that 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 the data. | SC.8.N.1.1 (High) SC.8.N.1.2 (High) SC.8.N.1.3 (Moderate) SC.8.N.1.4 (High) SC.8.N.1.5 | Students should be able to explain the major processes involved in conducting a scientific investigations. Students should be able to analyze how scientists choose their methods, develop explanations, and identify support | Hypothesis Control Dependent Variable Independent Variable Replication Empirical Evidence Scientific Inquiry |

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| operates. | <ul style="list-style-type: none"> analyze the methods used to develop a scientific explanation as seen in different fields of science. 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 the collected evidence. | <p>(High)</p> <p>SC.8.N.1.6 (Moderate)</p> | <p>for a theory.</p> <p>Students should be able to define and understand the collection of empirical evidence and the use of logical reasoning.</p> <p>Students should be able to use tables, graphs, and models to display and analyze scientific data.</p> | <p>Observation</p> <p>Inference</p> <p>Experiment</p> <p>Predictions</p> <p>Data</p> |
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| UNIT/ORGANIZING PRINCIPLE: The Nature of Science | | Pacing: *August-June First 9 weeks: Week 6 | | |
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| Essential Question(s): 1. What are the characteristics of science? 2. How do scientists develop explanations? 3. How do scientists discover things? 4. How do scientists show the results of investigations? | | | *Big Idea 2: The Characteristics of Scientific Knowledge | |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| <i>The Characteristics of Scientific Knowledge</i> | <ul style="list-style-type: none"> • distinguish between scientific and pseudoscientific ideas • discuss what characterizes science and its methods. | SC.8.N.2.1 (Moderate) SC.8.N.2.2 (Moderate) | Students should be able to distinguish what characterizes science and scientific explanations, and differentiate between science and pseudoscience. | Pseudoscience |

| UNIT/ORGANIZING PRINCIPLE: The Nature of Science | | Pacing: *August-June First 9 weeks: Week 9 | | |
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| Essential Question(s) 1. As tomorrow citizens, can students identify issues about which society could provide input, formulate scientifically investigable questions about those issues, construct investigations of their questions, collect and evaluate data from their investigations, and develop scientific recommendations based upon their findings? | | | | *Big Idea 4: Science and Society |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| Science and Society | <ul style="list-style-type: none"> 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. | SC.8.N.4.1 (Moderate) SC.8.N.4.2 (High) | Students should be able to describe the impact that science has had on society and society has had on science, especially in regard to political, social and economic concerns and decisions. | Informed Decision Making Politics Economics Society |

| UNIT/ORGANIZING PRINCIPLE: Physical Science/The Properties of Matter | | Pacing: 9 Weeks Second nine weeks: Weeks 1-9 | | |
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| Essential Question(s) 1. How do particles in solids, liquids and gases move? 2. What properties define matter? 3. What are physical and chemical properties of matter? 4. How do pure substances and mixtures compare? 5. How are elements arranged on the periodic table? 6. What makes up an atom? 7. What are physical and chemical changes of matter? | | | | Big Idea 8: Properties of Matter |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| Properties of Matter | <ul style="list-style-type: none"> explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases. 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. explore and describe the densities of various materials through measurement of their masses and volume. 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. | SC.8.P.8.1 (Moderate) SC.8.P.8.2 (Moderate) SC.8.P.8.3 (Moderate) SC.8.P.8.4 (Moderate) SC.8.P.8.5 (Low) | Students should be able to relate mass, weight, volume, and density to one another. Students should be able to classify and compare substances based on their physical and chemical properties. | Matter Weight Mass Volume Density Physical property Chemical property Solid Liquid Gas Atom Element |

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| <p><i>Properties of Matter (continued)</i></p> | <ul style="list-style-type: none"> • 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. • recognize that elements are grouped in the periodic table according to similarities of their properties • explore the scientific theory of atoms (also known as the scientific 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). • identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts. • distinguish among mixtures (including solutions) and pure substances. | <p>SC.8.P.8.6 (Low)</p> <p>SC.8.P.8.7 (Moderate)</p> <p>SC.8.P.8.8 (Moderate)</p> <p>SC.8.P.8.9 (Moderate)</p> | <p>Students should be able to model the motion of particles in solids liquids and gases.</p> <p>Students should be able to distinguish between pure substances and mixtures.</p> <p>Students should be able to describe the relationship between the arrangement of elements on the periodic table and the properties of those elements.</p> | <p>Compound Mixture Pure substance Heterogeneous Homogeneous Proton Neutron Nucleus Electron Electron cloud Atomic number Mass number Periodic table Chemical symbol Average atomic mass Metal Non-metal Metalloid Group Period</p> |
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| UNIT/ORGANIZING PRINCIPLE: Physical Science/ The Properties of Matter | | Pacing: 2 weeks Third nine weeks: Week 1-2 | | |
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| Essential Question(s) 1. In what ways can matter undergo change? 2. Compare and contrast physical and chemical changes. | | | | <u>Big Idea 9:</u> Changes of Matter |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| Changes in Matter | <ul style="list-style-type: none"> • explores the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes. • differentiate between physical and chemical changes. • investigate and describe how temperature influences chemical changes. | SC.8.P.9.1 (High) SC.8.P.9.2 (Moderate) SC.8.P.9.3 (High) | Students should be able to distinguish between chemical and physical changes in matter. | Law of Conservation of Mass Chemical Change Physical Change |

| UNIT/ORGANIZING PRINCIPLE: Life Science/ Organization and Development of Living Organisms | | Pacing: 2 weeks Third nine weeks: Weeks 3-4 | | |
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| Essential Question(s) 1. How do cells get and use energy? 2. How do energy and matter move through ecosystems? | | | | <i>Big Idea 18: Matter and Energy Transformation</i> |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| <i>Matter and Energy Transformations</i> | <ul style="list-style-type: none"> 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 release carbon dioxide. construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment. Cite evidence that living systems follow the Laws of Conservation of Mass and Energy | <p>SC.8.L.18.1 (High)</p> <p>SC.8.L.18.2 (High)</p> <p>SC.8.L.18.3 (High)</p> <p>SC.8.L.18.4 (High)</p> | <p>Students should be able to explain how cells capture and release energy.</p> <p>Students should be able to explain how the energy and matter in ecosystems are connected by the carbon cycle.</p> | <p>Photosynthesis</p> <p>Cellular Respiration</p> <p>Chlorophyll Energy</p> <p>Matter</p> <p>Law of Conservation of Energy</p> <p>Law of Conservation of Mass</p> <p>Energy pyramid</p> <p>Carbon Cycle</p> |

| UNIT/ORGANIZING PRINCIPLE: Earth and Space Science/ Earth in Space in Time | | Pacing: 10 weeks Third nine weeks: weeks 5-9 | | |
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| Essential Question(s) <ol style="list-style-type: none"> 1. What makes up the universe? 2. What are some properties of stars? 3. How have people modeled the solar system? 4. Why is gravity important in the solar system? 5. What are the properties of the sun? 6. What is known about the terrestrial planets? 7. What is known about the gas giants? 8. What is found in the solar system besides the sun, planets, and moons? 9. How are Earth’s days, years, and seasons related to the way Earth moves in space? 10. How do Earth, the moon, and the sun affect each other? 11. What causes tides? 12. What can we learn from space images? 13. How do people explore space? 14. How has space exploration affected Florida? | | <u>Big Idea 5:</u> Earth in Space and Time | | |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| Earth in Space and Time | <ul style="list-style-type: none"> • recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand the distance. • recognize that the universe contains many billions of galaxies | SC.8.E.5.1 (Moderate) SC.8.E.5.2 (Low) | Students should be able to describe the structure of the universe including the | Solar System Planet Star magnitude Luminosity |

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| | <p>and that each galaxy contains many billions of stars.</p> <ul style="list-style-type: none"> distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition. explore the Law of Gravitation by explaining the role that gravity plays in the formation of planets, stars, and 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 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. 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. | <p>SC.8.E.5.3 (High)</p> <p>SC.8.E.5.4 (High)</p> <p>SC.8.E.5.5 (Moderate)</p> <p>SC.8.E.5.6 (Low)</p> <p>SC.8.E.5.7 (Moderate)</p> | <p>scale of distances in the universe.</p> <p>Students should be able to describe stars and their physical properties.</p> <p>Students should be able to compare various historical models of the solar system.</p> <p>Students should be able to explain the role that gravity played in the formation of the solar system and in determining the motion of the planets.</p> <p>Students should be able to describe the structure and rotation of the sun, energy production and energy transport</p> | <p>Absolute magnitude Heliocentric Geocentric Parallax Gravity Orbit Aphelion Perihelion Centripetal force Solar nebula Planetesimal Nuclear fusion Sunspot Solar flare Prominence Terrestrial planet Astronomical unit Gas giant Planetary ring Dwarf planet Kuiper belt Kuiper belt object Comet Oort cloud Asteroid Meteoroid Meteor Meteorite Rotation Day Revolution Year Season</p> |
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| | | | <p>in the sun and solar activity on the sun.</p> <p>Students should be able to describe some of the properties of the terrestrial planets and how the properties of Mercury, Venus, and Mars differ from the properties of Earth.</p> <p>Students should be able to describe some of the properties of the gas giant planets and how these properties differ from the physical properties of Earth.</p> <p>Student should be able to compare and contrast the properties of small bodies of the solar system.</p> | <p>Equinox Solstice Satellite Gravity Lunar phases Eclipse Umbr Penumbra Tide Tidal range Spring tide Neap tide Wavelength Electromagnetic spectrum Spectrum Probe Artificial satellite NASA Launch Spinoff</p> |
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| | | | <p>Student should be able to relate Earth's days, years, and seasons to Earth's movement in space.</p> <p>Students should be able to describe the effects the sun and the moon have on Earth, including gravitational attraction, moon phases, and eclipses.</p> <p>Students should be able to explain what tides are and what causes them in Earth's oceans and to describe variations in the tides.</p> <p>Students should be able to describe ways of collecting information from space and analyze</p> | |
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| UNIT/ORGANIZING PRINCIPLE: Earth and Space Science/ Earth in Space in Time | | Pacing: 10 Weeks Fourth nine weeks: weeks 1-5 | | |
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| Essential Question(s) 1. How do gravity and energy influence the formation of the galaxies, including our own Milky Way Galaxy, the planetary systems, and Earth? 2. How has space exploration affected the economy and culture of Florida? | | Big Idea 5: Earth in Space in Time | | |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| <i>Earth in Space and Time (Continued)</i> | <ul style="list-style-type: none"> compare various historical models of the Solar System, including geocentric and heliocentric. explain the impact of objects in space on each other including: the Sun on the Earth including seasons and gravitational attraction the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body. 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, and communication of information. 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. | SC.8.E.5.8 (Moderate) SC.8.E.5.9 (High) SC.8.E.5.10 (High) SC.8.E.5.11 (High) SC.8.E.5.12 (Moderate) | how different wavelengths of the electromagnetic spectrum provide different information. Students should be able to analyze the ways people explore outer space and assess the role of technology in these efforts. Students should be able to summarize the effects of space exploration on the economy and culture of Florida | Moon Planets Historical Models of Solar System Seasons Tides Eclipses Technology Electromagnetic Spectrum Space Exploration |

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| | <ul style="list-style-type: none">• summarize the effects of space exploration on the economy and culture of Florida. | | | |
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| UNIT/ORGANIZING PRINCIPLE: Earth Structures | | Pacing: 2 weeks Fourth nine weeks: Weeks 6-7 | | |
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| Essential Question(s) 1. What is the scientific theory of plate tectonics? 2. Describe over time, the internal and external sources of energy and how it has altered the features of Earth? | | | | Big Idea: Standard 6: Earth Structures- 9th grade benchmarks. |
| Concepts/ Content | Learning Targets/Skills | Benchmarks | Essential Content and Understanding | Key Terminology |
| <i>Earth Structures</i> | <ul style="list-style-type: none"> • Describe and differentiate the layers of Earth and the interactions among them. • Connect surface features to surface processes that are responsible for their formation. • Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates. | SC.912.E.6.1 (Moderate) SC.912.E.6.2 (Moderate) SC.912.E.6.3 (High) | Students will be able to distinguish and label the layers of Earth. Students will be able to describe how the movement of Earth's tectonic plates causes mountain building. | Inner Core Outer Core Mantle Crust Plate Tectonics |

| Benchmarks Big Idea 1, 2, 3, 4 Nature of Science | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus, Comprehensive Science Assessment |
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| SC.8.N.1.1 | <ul style="list-style-type: none"> • Science Fair experiment or Classroom experiment • Work with reading coach on research, hypothesis, log book and conclusion • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.1.2 | <ul style="list-style-type: none"> • Science Fair experiment or Classroom experiment • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.1.3 | <ul style="list-style-type: none"> • Science Fair experiment or Classroom experiment • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.1.4 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.1.5 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.1.6 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab |
| SC.8.N.2.1 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.2.2 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab |
| SC.8.N.3.1 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab and Unit lab |
| SC.8.N.3.2 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab |
| SC.8.N.4.1 | <ul style="list-style-type: none"> • Fusion Lab Manual: Quick lab |

| Benchmarks Big Idea 8 Properties of Matter | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus, Comprehensive Science Assessment |
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| SC.8.P.8.1 | Quick lab Loose in the Lab: Atoms in a cage and Thermal Ink Clouds |
| SC.8.P.8.2 | Quick lab Loose in the Lab: Spring balance weigh in |
| SC.8.P.8.3 | Quick lab and Unit lab Loose in the Lab: Rock profile |
| SC.8.P.8.4 | Quick lab and Unit lab Loose in the Lab: Cubes to Clouds, Eco-peanut puzzle, Electrical Conductors, Finding Ferrous |
| SC.8.P.8.5 | Quick Lab Loose in the Lab: Relatively Elemental, Marshmallow molecules |
| SC.8.P.8.6 | Quick Lab Loose in the Lab: Flame test and Metal Family Portrait |
| SC.8.P.8.7 | Quick Lab Loose in the Lab: Atomic models |
| SC.8.P.8.8 | Quick Lab Loose in the Lab: Bloody fingerprints, Foam Gnomes, Surprise fire, Baking Soda Cannons |
| SC.8.P.8.9 | Quick Lab and Unit Lab Loose in the Lab: Ironing out Sand |

| Benchmarks Big Idea 9: Changes in Matter | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus |
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| SC.8.P.9.1 | <ul style="list-style-type: none">• Quick lab• Loose in the lab: Baking soda balloons.• Demo: Instant Sunshine |
| SC.8.P.9.2 | <ul style="list-style-type: none">• Quick lab and unit lab• Loose in the lab: Mini lava lamp |
| SC.8.P.9.3 | <ul style="list-style-type: none">• Quick lab and unit lab• Loose in the lab: Atoms in a cage and Sugar Cube Catastrophe |

| Benchmark Big Idea 5 Earth and Space | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus |
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| SC.8.E.5.1 | <ul style="list-style-type: none"> • Quick lab and Unit lab • Loose in the Lab: Mapping Orion |
| SC.8.E.5.2 | <ul style="list-style-type: none"> • Quick lab • Loose in the Lab: Demo Nebula Name Game |
| SC.8.E.5.3 | <ul style="list-style-type: none"> • Quick lab and unit lab • Loose in the Lab: Micro Solar System |
| SC.8.E.5.4 | <ul style="list-style-type: none"> • Quick lab • Loose in the Lab: No Lab • Internet resources |
| SC.8.E.5.5 | <ul style="list-style-type: none"> • Quick lab and unit lab • Loose in the Lab: Classify Stars and Measuring Magnitude • Discuss Hertzsprung Russel Dot Fest • Measuring magnitude |
| SC.8.E.5.6 | <ul style="list-style-type: none"> • Quick lab and Unit lab • Loose in the Lab: Solar Profile |
| SC.8.E.5.7 | <ul style="list-style-type: none"> • Quick and Unit • Loose in the Lab: Group Project; Mercury's Hidden Face; Atmospheric Opacity; Big Blue; Olympus Monster; Seeing Saturn's Rings; Gas Giant #3; Jupiter Sun Spots; Pluto and Charon; Internal Thermal Furnace |
| SC.8.E.5.8 | <ul style="list-style-type: none"> • Quick lab |
| SC.8.E.5.9 | <ul style="list-style-type: none"> • Quick and Unit lab • Loose in the Lab: Demo Zip Drip and Splash Discuss the Reasons for the Seasons |

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| | <p>Demo Lunar Eclipse Discuss Lunar Phases and Moon Tides Lab The Reason for the Seasons Lab Lunar Phases and Moon Tides</p> |
| SC.8.E.5.10 | <ul style="list-style-type: none"> • Quick lab and Unit lab • Loose in the Lab: Introducing the EMS |
| SC.8.E.5.11 | <ul style="list-style-type: none"> • Quick lab • Loose in the Lab: Introducing the EMS and Nebula Name Game |
| SC.8.E.5.12 | <ul style="list-style-type: none"> • Quick lab • Loose in the Lab: None • Will use Discovery Education and other related sources |

| Benchmarks Big Idea 18: Matter and Energy Transformations | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus |
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| SC.8.L.18.1 | <ul style="list-style-type: none"> • Quick lab and Unit lab • Loose in the Lab: Photosynthetic Funnel |
| SC.8.L.18.2 | <ul style="list-style-type: none"> • Quick lab and unit lab • Loose in the Lab: CO2 Exchange |
| SC.8.L.18.3 | <ul style="list-style-type: none"> • Quick lab • Loose in the Lab: Review CO2 Exchange • Art Project Carbon Cycle |
| SC.8.L.18.4 | <ul style="list-style-type: none"> • Quick lab and Unit lab • Loose in the Lab: None |

| Benchmarks Standard 6 & 7 (9th Grade Benchmarks) | Activities and Resources Fusion text, Loose in the Lab, ScienceSaurus |
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| SC.912.E.6.1 | <ul style="list-style-type: none"> • Textbook Chapter 2/Sect 1 • Earth's layers foldable: http://mjkscteachingideas.com/plate.html |
| SC.912.E.6.2 | <ul style="list-style-type: none"> • Textbook Chapter 2/Sect 1 • http://mjkscteachingideas.com/plate.html |
| SC.912.E.6.3 | <ul style="list-style-type: none"> • Textbook Chapter 2/Sect 1 • http://mjkscteachingideas.com/plate.html • http://www.pbs.org/wgbh/aso/tryit/tectonics/ |
| SC.912.E.7.2 | <ul style="list-style-type: none"> • Textbook Chapter 19/Sect 1 • http://science-class.net/Lessons/Ocean/ocean_currents.pdf |
| SC.912.E.7.3 | <ul style="list-style-type: none"> • http://facstaff.gpc.edu/~pgore/Earth&Space/GPS/Earth-systems.html |