Hainesport Township School District
211 Broad Street Hainesport, NJ 08036

Course Title: Science Grade: 7
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Introduction 2020 New Jersey Student Learning Standards

Science Introduction Science Scientific and technological advances have proliferated and now permeate most aspects of life in the 21st century. It is increasingly important that all members of our society develop an understanding of scientific and engineering concepts and processes. Learning how to construct scientific explanations and how to design evidence-based solutions provides students with tools to think critically about personal and societal issues and needs. Students can then contribute meaningfully to decision-making processes, such as discussions about climate change, new approaches to health care, and innovative solutions to local and global problems.

Mission

Mission All students will possess an understanding of scientific concepts and processes required for personal decision making, participation in civic life, and preparation for careers in STEM fields (for those that chose).

Vision

Prepare students to become scientifically literate individuals who can effectively:

- Apply scientific thinking, skills, and understanding to real-world phenomena and problems;
- Engage in systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned;
- Conduct investigations, solve problems, and engage in discussions;
- Discuss open-ended questions that focus on the strength of the evidence used to generate claims;

• Read and evaluate multiple sources, including science-related magazine and journal articles and web-based resources to gain knowledge about current and past science problems and solutions and develop well reasoned claims; and
• Communicate ideas through journal articles, reports, posters, and media presentations that explain and argue.

Spirit and Intent The New Jersey Student Learning Standards for Science (NJSLS-S)

Describe the expectations for what students should know and be able to do as well as promote three-dimensional science instruction across the three science domains (i.e., physical sciences, life science, earth and space sciences). From the earliest grades, the expectation is that students will engage in learning experiences that enable them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments (in appropriate ways relative to their grade level). The foundation of the NJSLS-S reflects three dimensions — science and engineering practices, disciplinary core ideas, and crosscutting concepts. The performance expectations are derived from the interplay of these three dimensions. It is essential that these three components are integrated into all learning experiences. Within each standard document, the three dimensions are intentionally presented as integrated components to foster sensemaking and designing solutions to problems. Because the NJSLS-S is built on the notions of coherence and contextuality, each of the science and engineering practices and crosscutting concepts appear multiple times across New Jersey Department of Education June 2020 1 topics and at every grade level. Additionally, the three dimensions should be an integral part of every curriculum unit and should not be taught in isolation.

Course Description and Concepts

Grade 8 Science is a hands-on inquiry based course in which students investigate topics related to life science, physics, chemistry and earth/space science. The course will help students to understand some of the basic principles of life science and acquire useful science and laboratory skills helping them to develop and design models to explain phenomenon. A student's ability to understand the discoveries of science rests in their ability to relate those ideas to the real world. Topics of study are to include: forces and motion, biodiversity and humans, chemical reactions and energy, structure and function, information processing, thermal energy, types of interactions and electromagnetic radiation.

New Jersey Student Learning Standards The Next Generation Science Standards

MS-PS1-3 Evidence Statements	MS-LS1-1 Evidence Statements	MS-LS1-2 Evidence Statements	MS-LS1-3 Evidence Statements
MS-LS1-4 Evidence Statements	MS-LS1-5 Evidence Statements	MS-LS1-6 Evidence Statements	MS-LS1-7 Evidence Statements
MS-LS1-8 Evidence Statements	MS-LS3-1 Evidence Statements	MS-LS3-2 Evidence Statements	MS-LS4-3 Evidence Statements
MS-LS4-4 Evidence Statements	MS-LS4-5 Evidence Statements	MS-LS4-6 Evidence Statements	MS-ESS3-3 Evidence Statements
MS-ESS3-4 Evidence Statements	MS-ESS3-5 Evidence Statements	MS-ETS1-1 Evidence Statements	MS-ETS1-2 Evidence Statements
MS-ETS1-3 Evidence Statements	MS-ETS1-4 Evidence Statements	**Next Generation Science Standards For Teachers** https://www.nextgenscience.org/teachers	

New Jersey Student Learning Standards for English Language Arts Companion Standards Grades 6-8 Progress Indicators Reading Science and Technical Subjects

RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts	RST.6-8.2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Craft and Structure	RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
RST.6-8.5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	RST.6-8.6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. Integration of Knowledge and Ideas

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	RST.6-8.8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
RST.6-8.9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. Range of Reading and Level of Text Complexity	RST.6-8.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

NJ Technology Standards

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Pacing Guide

Unit Topic	Unit #	APX Unit Length
Structure and Properties of Matter	I	20 Days
Changes in Matter	II	20 Days
Chemical Reactions	III	25 Days
Structure, Function, and Information Processing	IV	15 Days
Body Systems	V	15 Days
Inheritance and Variations of Traits	VI	20 Days
Organization for Matter and Energy Flow in Organisms	VII	15 Days
Earth Systems	VIII	30 Days

Unit 1 (Structure and Properties of Matter)	
Content Area	Science
Unit Title	Structure and Properties of Matter
Grade Level	Grade 7
Recommended Pacing	APX: 20 Days
Unit Summary	Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level account to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, and the influence of science, engineering and technology on society and the natural world provide a framework for understanding the disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Global and Cultural Awareness:*** Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
Computer Science and Design Thinking	***Interaction of Technology and Humans:*** Economic, political, social, and cultural aspects of society drive development of new technological products, processes, and systems.
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS-PS1 Matter and its Interactions

Science Student Learning Objectives Covered in this Unit
• Develop models to describe the atomic composition of simple molecules and extended structures. *[Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms. The substructure of atoms and the periodic table are learned in high school chemistry.]* [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete depiction of all individual atoms in a complex molecule or extended structure.] (MS-PS1-1) • Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. *[Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.]* [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.] (MS-PS1- 2)
ELA Student Learning Objectives Covered in this Unit
• Cite specific textual evidence to support analysis of science and technical texts on the characteristic properties of pure substances. Attend to precise details of explanations or descriptions about the properties of substances before and after they undergo a chemical process. • Integrate qualitative information (flowcharts, diagrams, models, graphs, or tables) about the characteristic properties of substances before and after a chemical process has occurred with a version of that information expressed visually, or integrate technical information about the characteristic properties of substances before and after a chemical process has occurred with a version of that information expressed visually.
Math Student Learning Objectives Covered in this Unit
• Integrate quantitative or technical information about the composition of simple molecules and extended structures that is expressed in words in a text with a version of that information expressed in a model. • Reason quantitatively (with amounts, numbers, sizes) and abstractly (with variables). • Develop a mathematical model to describe the atomic composition of simple molecules and extended structures. • Use ratio and rate reasoning to describe the atomic composition of simple molecules and extended structures. • Reason quantitatively with amounts, numbers, and sizes for properties like density, melting point, boiling point, solubility, flammability, and odor, and reason abstractly by assigning labels or symbols. • Use ratio and rate reasoning to determine whether a chemical reaction has occurred.

- Display numerical data for properties such as density, melting point, solubility, flammability, and order in plots on a number line, including dot plots, histograms, and box plots.
- Summarize numerical data sets on the properties of substances before and after the substances interact to determine whether a chemical reaction has occurred. The summary of the numerical data sets must be in relation to their context.

Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena. • Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: If the universe is not made of Legos®, then what is it made of?	
Concepts	**Formative Assessments**
• Substances are made from different types of atoms. Atoms are the basic units of matter. • Substances combine with one another in various ways. Molecules are two or more atoms joined together.	• Students who understand the concepts are able to: • Develop a model of a simple molecule. • Use the model of the simple molecule to describe its atomic composition.

• Atoms form molecules that range in size from two to thousands of atoms. Molecules can be simple or very complex. • Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).	• Develop a model of an extended structure. • Use the model of the extended structure to describe its repeating subunits. *[Boundary: The substructure of atoms and the periodic table are learned in high school chemistry.]*
Unit Sequence/Essential Question: Part B: Is it possible to tell if two substances mixed or if they reacted with each other?	
Concepts	**Formative Assessments**
• Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. • Substances react chemically in characteristic ways. • In a chemical process, the atoms that make up the original substances are regrouped into different molecules; these new substances have different properties from those of the reactants. • The analysis of data on the properties of products and reactants can be used to determine whether a chemical process has occurred. • Density, melting point, boiling point, solubility, flammability, and odor are characteristic properties that can be used to identify a pure substance. • Macroscopic patterns are related to the nature of the atomic-level structure of a substance.	• Students who understand the concepts are able to: • Analyze and interpret data to determine similarities and differences from results of chemical reactions between substances before and after they undergo a chemical process. • Analyze and interpret data on the properties of substances before and after they undergo a chemical process. • Identify and describe possible correlation and causation relationships evidenced in chemical reactions. • Make logical and conceptual connections between evidence that chemical reactions have occurred and explanations of the properties of substances before and after they undergo a chemical process.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. • Unit Test 1 Assessment (Structure and Properties of Matter) • Vocabulary Quiz 1/2/3

- Teacher constructed standards based quiz Part A, Part B, Part C
- Alternative Assessment Teacher Constructed 1

Unit 2 (Changes in Matter**)**	
Content Area	Science
Unit Title	Changes in Matter
Grade Level	Grade 7
Recommended Pacing	APX: 20 Days
Unit Summary	Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level account to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, and the influence of science, engineering and technology on society and the natural world provide a framework for understanding the disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Global and Cultural Awareness:*** Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
Computer Science and Design Thinking	***Nature of Technology***: Sometimes a technology developed for one purpose is adapted to serve other purposes.
Supplemental Class Resources	GSuite for Education

	MosaMac Program NEWSELA MS-PS1 Matter and its Interactions

Science Student Learning Objectives Covered in this Unit
• Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. *[Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.]* [Assessment Boundary: Assessment is limited to qualitative information.] (MS-PS1-3) • Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. *[Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]* (MS-PS1-4)
ELA Student Learning Objectives Covered in this Unit
• Cite specific text to support the analysis of evidence that synthetic materials formed from natural resources affect society. Attend to the precise details of explanations or descriptions. • Gather relevant information from multiple print and digital sources about the impact on society of synthetic materials that are formed from natural resources. Use search terms effectively, assess the credibility and accuracy of each source, and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
Math Student Learning Objectives Covered in this Unit
• Integrate quantitative information about changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed that is expressed in words with a version of that information that is expressed visually. • Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Use positive and negative numbers to represent changes in particle motion and temperature when thermal energy is added or removed, explaining the meaning of zero in each situation.
Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: How can you tell what the molecules are doing in a substance?	
Concepts	**Formative Assessments**
• Changes in particle motion, temperature, and state of a pure substance occur when thermal energy is added or removed. • Qualitative molecular-level models of solids, liquids, and gases can be used to show that adding or removing thermal energy increases or decreases the kinetic energy of the particles until a change of state occurs. • Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. • In a liquid, the molecules are constantly in contact with others. • In a gas, the molecules are widely spaced except when they happen to collide. • In a solid, atoms are closely spaced and may vibrate in	• Develop a model that predicts and describes changes in particle motion that could include molecules or inert atoms or pure substances. • Use cause-and-effect relationships to predict changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed in natural or designed systems.

position but do not change relative locations. ● The changes of state that occur with variations in temperature or pressure can be described and predicted using models of matter. ● The term heat as used in everyday language refers both to thermal energy and the transfer of that thermal energy from one object to another. ● Thermal energy is the motion of atoms or molecules within a substance. ● In science, heat is used to refer to the energy transferred due to the temperature difference between two objects. ● The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). ● The details of the relationship between the average internal kinetic energy and the potential energy per atom or molecule depend on the type of atom or molecule and the interactions among the atoms in the material. ● Temperature is not a direct measure of a system's total thermal energy. ● The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. ● Cause-and-effect relationships may be used to predict and describe changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed in natural systems.	
Unit Sequence/Essential Question: Part B: How can we trace synthetic materials back to natural ingredients?	
Concepts	**Formative Assessments**

● Each pure substance has characteristic physical and chemical properties that can be used to identify it. ● Substances react chemically in characteristic ways. ● In a chemical process, the atoms that make up the original substances are regrouped into different molecules. ● New substances that result from chemical processes have different properties from those of the reactants. ● Natural resources can undergo a chemical process to form synthetic material. ● Structures can be designed to serve particular functions by taking into account properties of different materials and how materials can be shaped and used. ● Engineering advances have led to discoveries of important synthetic materials, and scientific discoveries have led to the development of entire industries and engineered systems using these materials. ● Technology use varies from region to region and over time. ● The uses of technologies (engineered/synthetic materials) and any limitations on their use are driven by individual or societal needs, desires, and values. ● The uses of technologies (engineered/synthetic materials) and any limitations on their use are driven by the findings of scientific research and by differences in such factors as climate, natural resources, and economic conditions.	● Students who understand the concepts are able to: ● Obtain, evaluate, and communicate information to show that synthetic materials come from natural resources and affect society. ● Gather, read, and synthesize information about how synthetic materials formed from natural resources affect society. ● Assess the credibility, accuracy, and possible bias of each publication and methods used within the publication. ● Describe how information about how synthetic materials formed from natural resources affect society is supported or not supported by evidence.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. ● Unit Test Assessment (Changes in Matter) ● Vocabulary Quiz 1/2/3 ● Teacher constructed standards based quiz Part A, Part B, Part C

- Alternative Assessment Teacher Constructed 1

Unit 3 (Chemical Reactions)	
Content Area	Science
Unit Title	Chemical Reactions
Grade Level	Grade 7
Recommended Pacing	APX: 25 Days
Unit Summary	Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Students also apply their understanding of optimization design and process in engineering to chemical reaction systems. The crosscutting concept of energy and matter provides a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in developing and using models, analyzing and interpreting data, designing solutions, and obtaining, evaluating, and communicating information. Students are also expected to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Global and Cultural Awareness:*** Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
Computer Science and Design Thinking	***Nature of Technology:*** Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.
Supplemental Class Resources	GSuite for Education MosaMac Program

	NEWSELA MS-PS1 Matter and its Interactions MS-ETS1 Engineering Design

Science Student Learning Objectives Covered in this Unit
• Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. *[Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.]* [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.] (MS-PS1-5) • Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* *[Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.]* [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.] (MS-PS1-6) • Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)
ELA Student Learning Objectives Covered in this Unit
• Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks related to chemical reactions that release energy and some that store energy. • Cite specific textual evidence to support analysis of science and technical texts on the design and modification of a device that controls the transfer of energy to the environment using factors such as type and concentration of a substance. • Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the design and modification of a device that controls the transfer of energy to the environment using factors such as type and concentration of a substance. • Conduct research on the design and modification of a device that controls the transfer of energy to the environment using factors such as type and concentration of a substance to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. • Draw evidence from informational texts to support analysis, reflection, and research on the design and modification of a device that controls the transfer of energy to the environment using factors such as type and concentration of a substance.

- Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points on the design and modification of a device that controls the transfer of energy to the environment.

Math Student Learning Objectives Covered in this Unit

- Integrate quantitative information expressed in words about atoms before and after a chemical process with a version of that information expressed in a physical model or drawing, including digital forms.
- Reason quantitatively and abstractly during communication about melting or boiling points.
- Use mathematics to model the law of conservation of matter. • Use ratio and rate reasoning to describe how the total number of atoms does not change in a chemical reaction, and thus mass is conserved.
- Reason quantitatively and abstractly: Reason quantitatively using numbers to represent the criteria (amount, time, and temperature of substance) when testing a device that either releases or absorbs thermal energy by chemical processes; reason abstractly by assigning labels or symbols.
- Collect and analyze numerical data from tests of a device that either releases or absorbs thermal energy by chemical processes. Determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. Pose problems with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate the numerical data with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computations and estimation strategies.
- Develop a probability model and use it as part of an iterative process for testing to find the probability that a promising design solution will lead to an optimal solution. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy in order to ultimately develop an optimal design.

Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: What happens to the atoms when I bake a cake?	
Concepts	**Formative Assessments**
• Substances react chemically in characteristic ways. • In a chemical process, the atoms that make up the original substances are regrouped into different molecules. • New substances created in a chemical process have different properties from those of the reactants. • The total number of each type of atom in a chemical process is conserved, and thus the mass does not change (the law of conservation of matter). • Matter is conserved because atoms are conserved in physical and chemical processes. • The law of conservation of mass is a mathematical description of natural phenomena.	• Students who understand the concepts are able to: • Use physical models or drawings, including digital forms, to represent atoms in a chemical process. • Use mathematical descriptions to show that the number of atoms before and after a chemical process is the same.
Unit Sequence/Essential Question: Part B: How can a device be designed, constructed, tested, and modified that either releases or absorbs thermal energy by chemical processes?	
Concepts	**Formative Assessments**
• Some chemical reactions release energy, while others store energy. • The transfer of thermal energy can be tracked as energy flows	• Students who understand the concepts are able to: • Undertake a design project, engaging in the design cycle, to construct, test, and modify a device that either releases or

through a designed or natural system. ● Models of all kinds are important for testing solutions. ● There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. ● The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. ● A solution needs to be tested and then modified on the basis of the test results in order for it to be improved. The characteristics of the design that performed the best in each test can provide useful information for the redesign process. ● Some of the characteristics identified as having the best performance may be incorporated into the new design.	absorbs thermal energy by chemical processes. ● Specific criteria are limited to amount, time, and temperature of a substance. ● Analyze and interpret data for the amount, time, and temperature of a substance in testing a device that either releases or absorbs thermal energy by chemical processes to determine similarities and differences in findings. ● Develop a model to generate data for testing a device that either releases or absorbs thermal energy by chemical processes, including those representing inputs and outputs of thermal energy. ● Track the transfer of thermal energy as energy flows through a designed system that either releases or absorbs thermal energy by chemical processes.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. ● Unit Test Assessment (Chemical Reactions) ● Vocabulary Quiz 1/2/3/4 ● Teacher constructed standards based quiz Part A, Part B, Part C, Part D ● Alternative Assessment Teacher Constructed 1

Unit 4 (Structure and Function)	
Content Area	Science
Unit Title	Structure and Function

Grade Level	Grade 7
Recommended Pacing	APX: 15 Days
Unit Summary	Students demonstrate age appropriate abilities to plan and carry out investigations to develop evidence that living organisms are made of cells. Students gather information to support explanations of the relationship between structure and function in cells. They are able to communicate an understanding of cell theory and understand that all organisms are made of cells. Students understand that special structures are responsible for particular functions in organisms. They then are able to use their understanding of cell theory to develop and use physical and conceptual models of cells. The crosscutting concepts of scale, proportion, and quantity and structure and function provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in planning and carrying out investigations, analyzing and interpreting data, and developing and using models, Students are also expected to use these to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Critical Thinking and Problem-solving:*** Multiple solutions exist to solve a problem.
Computer Science and Design Thinking	***Nature of Technology:*** Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS -LS1 From Molecules to Organisms: Structures and Processes

Science Student Learning Objectives Covered in this Unit
● Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of

cells. *[Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]* (MS-LS1-1)

- Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. *[Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.]* [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.] (MS-LS1-2)

ELA Student Learning Objectives Covered in this Unit

- Conduct a short research project collecting evidence that living things are made of cells to answer a question (including a self-generated question). Draw on several sources and generate additional related, focused questions that allow for multiple avenues of exploration.
- Integrate multimedia and visual displays of cells and specific cell parts into presentations to clarify information, strengthen claims and evidence, and add interest.

Math Student Learning Objectives Covered in this Unit

- Use variables to represent two quantities, such as the number of cells that makes up an organism and units representing the size or type of the organism, and determine the relationship between these two variables.
- Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
- Use variables to represent two quantities in a real-world problem that change in relationship to one another—for example, determining the ratio of a cell's surface area to its volume. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.

- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: How will astrobiologists know if they have found life elsewhere in the solar system?	
Concepts	**Formative Assessments**
• Distinguish between living and nonliving things. • Cells are the smallest unit of life that can be said to be alive. • All living things are made up of cells, either one cell or many different numbers and types of cells. • Organisms may consist of one single cell (unicellular). • Nonliving things can be composed of cells. • Organisms may consist of many different numbers and types of cells (multicellular). • Cells that can be observed at one scale may not be observable at another scale. • Engineering advances have led to important discoveries in the field of cell • Biology, and scientific discoveries have led to the development of entire industries and engineered systems.	• Students who understand the concepts are able to: • Conduct an investigation to produce data that provides evidence distinguishing between living and nonliving things. • Conduct an investigation to produce data supporting the concept that living things may be made of one cell or many and varied cells. • Distinguish between living and nonliving things. • Observe different types of cells that can be found in the makeup of living things.
Unit Sequence/Essential Question: Part B: How do the functions of cells support an entire organism?	

Concepts	Formative Assessments
● The cell functions as a whole system. ● Identify parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall. ● Within cells, special structures are responsible for particular functions. ● Within cells, the cell membrane forms the boundary that controls what enters and leaves the cell. ● Complex and microscopic structures and systems in cells can be visualized, modeled, and used to describe how the function of the cell depends on the relationships among its parts. ● Complex natural structures/systems can be analyzed to determine how they function. ● A model can be used to describe the function of a cell as a whole. ● A model can be used to describe how parts of cells contribute to the cell's function. ● The structures of the cell wall and cell membrane are related to their function.	● Develop and use a model to describe the function of a cell as a whole. ● Develop and use a model to describe how parts of cells contribute to the cell's function. ● Develop and use models to describe the relationship between the structure and function of the cell wall and cell membrane.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. ● Unit Test Assessment (Structure and Function) ● Vocabulary Quiz 1/2/3 ● Teacher constructed standards based quiz Part A, Part B, Part C ● Alternative Assessment Teacher Constructed 1

Unit 5 (Body Systems)

Content Area	Science
Unit Title	Body Systems
Grade Level	Grade 7
Recommended Pacing	APX: 15 Days
Unit Summary	Students develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple-interaction subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. The cross cutting concepts of systems and system models and cause and effect provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in engaging in argument from evidence and obtaining, evaluating, and communicating information. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Critical Thinking and Problem-solving:*** Multiple solutions exist to solve a problem.
Computer Science and Design Thinking	***Nature of Technology:*** Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS -LS1 From Molecules to Organisms: Structures and Processes

Science Student Learning Objectives Covered in this Unit
• Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. *[Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.]* [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.] (MS-LS1-3) • Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.] (MS-LS1-8)
ELA Student Learning Objectives Covered in this Unit
• Cite specific textual evidence to support analysis of science and technical texts that provide evidence for how the body is a system of interacting subsystems composed of cells. • Trace and evaluate a text's argument that the body is a system of interacting subsystems composed of cells, distinguishing claims that are supported by reasons and evidence from claims that are not. • Write arguments, supported by evidence, for how the body is a system of interacting subsystems composed of groups of cells. • Gather relevant information concerning how sensory receptors function by responding to stimuli, then sending messages to the brain, which responds immediately through some form or behavior or by storing the messages as memory. Quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
Math Student Learning Objectives Covered in this Unit
• None
Modifications
(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.) • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).

- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: What is the evidence that a body is actually a system of interacting subsystems composed of groups of interacting cells?	
Concepts	**Formative Assessments**
• In multicellular organisms, the body is a system of multiple, interacting subsystems. • Subsystems are groups of cells that work together to form tissues. • Organs are groups of tissues that work together to perform a particular body function. • Tissues and organs are specialized for particular body functions. • Systems may interact with other systems. • Systems may have subsystems and be part of larger complex systems. • Interactions are limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems. • Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.	• Students who understand the concepts are able to: • Use an oral and written argument supported by evidence to support or refute an explanation or a model of how the body is a system of interacting subsystems composed of groups of cells.

Unit Sequence/Essential Question: Part B: How do organisms receive and respond to information from their environment?	
Concepts	**Formative Assessments**
• Sense receptors respond to different inputs (electromagnetic, mechanical, chemical). • Sense receptors transmit responses as signals that travel along nerve cells to the brain. • Signals are then processed in the brain. • Brain processing results in immediate behaviors or memories. • Cause-and-effect relationships may be used to predict response to stimuli in natural systems.	• Students who understand the concepts are able to: • Gather, read, and synthesize information from multiple appropriate sources about sensory receptors' response to stimuli. • Assess the credibility, accuracy, and possible bias of each publication and methods used. • Describe how publications and methods used are supported or not supported by evidence.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. • Unit Test Assessment (Body Systems) • Vocabulary Quiz 1/2/3 • Teacher constructed standards based quiz Part A, Part B, Part C • Alternative Assessment Teacher Constructed 1

Unit 6 (Inheritance and Variation of Traits)	
Content Area	Science
Unit Title	Inheritance and Variation of Traits
Grade Level	Grade 7
Recommended Pacing	APX: 20 Days

Unit Summary	Students develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. Students understand how genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic implications of sexual and asexual reproduction. The crosscutting concepts of cause and effect and structure and function provide a framework for understanding how gene structure determines differences in the functioning of organisms. Students are expected to demonstrate proficiency in developing and using models. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Critical Thinking and Problem-solving:*** Multiple solutions exist to solve a problem.
Computer Science and Design Thinking	***Engineering Design:*** The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS -LS3 Heredity: Inheritance and Variation of Traits

Science Student Learning Objectives Covered in this Unit
• Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. *[Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.]* [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.] (MS-LS3-1) • Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. [*Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]* (MS-LS3-2)

ELA Student Learning Objectives Covered in this Unit
● Cite specific textual evidence to support analysis of science and technical texts about structural changes to genes (mutations) located on chromosomes that may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. ● Determine the meaning of symbols, key terms, and other domain-specific phrases as they are used to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. ● Integrate quantitative or technical information about why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism that is expressed in words with a version of that information expressed visually in a flowchart, diagram, model, graph, or table. • Include multimedia components and visual displays in presentations about structural changes to genes (mutations) located on chromosomes that may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism to clarify claims and findings and emphasize salient points. ● Cite specific textual evidence for why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation to support analysis of science and technical texts. ● Determine the meaning of symbols, key terms, and other domain-specific phrases as they are used to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. ● Integrate quantitative or technical information that describes why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation that is expressed in words with a version of that information that is expressed visually in a flowchart, diagram, model, graph, or table. ● Include multimedia components and visual displays in presentations that describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation to clarify claims and findings and emphasize salient points.
Math Student Learning Objectives Covered in this Unit
● Use mathematics to model why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. ● Summarize numerical data sets that describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation in relation to their context.
Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: How do structural changes to genes (mutations) located on chromosomes affect proteins or affect the structure and function of an organism?	
Concepts	**Formative Assessments**
• Complex and microscopic structures and systems, such as genes located on chromosomes, can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among the parts of the system; therefore, complex natural structures/systems can be analyzed to determine how they function. • Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. • Each distinct gene chiefly controls the production of specific proteins, which in turn affect the traits of the individual.	• Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

• In addition to variations that arise from sexual reproduction, genetic information can be altered due to mutations. • Some changes to genetic material are beneficial, others harmful, and some neutral to the organism. • Changes in genetic material may result in the production of different proteins. • Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. • Structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism • Though rare, mutations may result in changes to the structure and function of proteins.	
Unit Sequence/Essential Question: Part B: How do asexual reproduction and sexual reproduction affect the genetic variation of offspring?	
Concepts	**Formative Assessments**
• Organisms reproduce either sexually or asexually and transfer their genetic information to their offspring. • Asexual reproduction results in offspring with identical genetic information. • Sexual reproduction results in offspring with genetic variation. • Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. • In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. • Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.	• Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information. • Develop and use a model to describe why sexual reproduction results in offspring with genetic variation. • Use models such as Punnett squares, diagrams, and simulations to describe the cause-and effect-relationship of gene transmission from parent(s) to offspring and resulting genetic variation.

• Punnett squares, diagrams, and simulations can be used to describe the cause-and-effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.	

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. • Unit Test Assessment (Inheritance and Variation of Traits) • Vocabulary Quiz 1/2/3 • Teacher constructed standards based quiz Part A, Part B, Part C • Alternative Assessment Teacher Constructed 1

Unit 7 (Organization for Matter and Energy Flow in Organisms)	
Content Area	Science
Unit Title	Organization for Matter and Energy Flow in Organisms
Grade Level	Grade 7
Recommended Pacing	APX: 15 Days
Unit Summary	Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. They construct scientific explanations for the cycling of matter in organisms and the interactions of organisms to obtain matter and energy from an ecosystem to survive and grow. They understand that sustaining life requires substantial energy and matter inputs, and that the structure and functions of organisms contribute to the capture, transformation, transport,

	release, and elimination of matter and energy. The crosscutting concepts of matter and energy and structure and function provide a framework for understanding of the cycling of matter and energy flow into and out of organisms. Students are also expected to demonstrate proficiency in developing and using models. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Critical Thinking and Problem-solving:*** Multiple solutions exist to solve a problem.
Computer Science and Design Thinking	***Nature of Technology:*** Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS -LS1 From Molecules to Organisms: Structures and Processes

Science Student Learning Objectives Covered in this Unit
• Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. *[Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]* (MS-LS1-6) • Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. *[Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.]* [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.] (MS-LS1-7)
ELA Student Learning Objectives Covered in this Unit
• Cite specific textual evidence to support analysis of science and technical texts about the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

- Determine the central ideas about the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinion.
- Write informative/explanatory texts to examine the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms, and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Draw evidence from informational texts to support analysis, reflection, and research about the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- Integrate multimedia and visual displays into presentations about how food is rearranged through chemical reactions to form new molecules that support growth and/or release energy as the matter moves through an organism to clarify information, strengthen claims and evidence, and add interest.

Math Student Learning Objectives Covered in this Unit

- Use variables to represent two quantities involved in the process whereby photosynthesis plays a part in the cycling of matter and energy into and out of organisms. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.

● Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: What is the role of photosynthesis in the cycling of matter and flow of energy into and out of an organism?	
Concepts	**Formative Assessments**
● Photosynthesis has a role in the cycling of matter and flow of energy into and out of organisms. ● The flow of energy and cycling of matter can be traced. ● The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon based organic molecules and release oxygen. ● Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. ● Sugars produced by plants can be used immediately or stored for growth or later use. ● Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	● Construct a scientific explanation for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms based on valid and reliable evidence obtained from sources (including the students' own experiments). ● Construct a scientific explanation for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms based on the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
Unit Sequence/Essential Question: Part B: How is food rearranged through chemical reactions to form new molecules that support growth and/or release energy as this matter moves through an organism?	
Concepts	**Formative Assessments**
● Food is rearranged through chemical reactions, forming new molecules that support growth. ● Food is rearranged through chemical reactions, forming new	● Develop and use a model to describe how food is rearranged through chemical reactions.

molecules that release energy as this matter moves through an organism. ● Molecules are broken apart and put back together to form new substances, and in this process, energy is released. ● Cellular respiration in plants and animals involves chemical reactions with oxygen that release stored energy. ● In cellular respiration, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. ● Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules to support growth or to release energy. ● Matter is conserved during cellular respiration because atoms are conserved in physical and chemical processes.	

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. ● Unit Test Assessment (Organization for Matter and Energy Flow in Organisms) ● Vocabulary Quiz 1/2/3 ● Teacher constructed standards based quiz Part A, Part B, Part C ● Alternative Assessment Teacher Constructed 1

Unit 8 (Earth Systems)	
Content Area	Science
Unit Title	Earth Systems
Grade Level	Grade 7

Recommended Pacing	APX: 30 Days
Unit Summary	Students examine geoscience data in order to understand processes and events in Earth's history. Important crosscutting concepts in this unit are scale, proportion, and quantity, stability and change, and patterns in relation to the different ways geologic processes operate over geologic time. An important aspect of the history of Earth is that geologic events and conditions have affected the evolution of life, but different life forms have also played important roles in altering Earth's systems. Students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. Students investigate the controlling properties of important materials and construct explanations based on the analysis of real geoscience data. Students are expected to demonstrate proficiency in analyzing and interpreting data and constructing explanations. They are also expected to use these practices to demonstrate understanding of the core ideas.
Interdisciplinary Connections	Primary Interdisciplinary Connections: ELA/Math
Career Readiness, Life Literacies, and Key Skills Addressed	***Creativity and Innovation:*** Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
Computer Science and Design Thinking	***Nature of Technology:*** Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.
Supplemental Class Resources	GSuite for Education MosaMac Program NEWSELA MS-ESS1 Earth's Place in the Universe MS-ESS2 Earth's Systems

Science Student Learning Objectives Covered in this Unit
• Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. *[Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are*

used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.] (MS-ESS1-4)

- Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. *[Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.]* [Assessment Boundary: Assessment does not include the identification and naming of minerals.] (MS-ESS2-1)
- Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. *[Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]* (MS-ESS2-2)
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. *[Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).]* [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.] (MS-ESS2-3)

ELA Student Learning Objectives Covered in this Unit

- Cite specific textual evidence based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history to support analysis of science and technical texts.
- Write informative/explanatory texts to examine evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Cite specific textual evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales to support analysis of science and technical texts.
- Use informative/explanatory texts to examine evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Include multimedia components and visual displays in presentations about evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales to clarify claims and findings and emphasize salient points.
- Cite specific textual evidence of past plate motion to support analysis of science texts.

- Integrate quantitative or technical information about evidence of past plate motions expressed in words in a text with a version of that information expressed in a flowchart, diagram, model, graph, or table.
- Compare and contrast the information gained from experiments, simulations, video, or multimedia sources showing evidence of past plate motion with that gained from reading a text on the same topic.

Math Student Learning Objectives Covered in this Unit

- Use variables to represent numbers and write expressions when solving problems while constructing explanations from evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history; understand that a variable can represent an unknown number or, depending on the purpose at hand, any number in a specific set.
- Use variables to represent quantities in a real-world or mathematical problem when solving problems while constructing explanations from evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- Reason abstractly and quantitatively when analyzing evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- Use variables to represent numbers and write expressions when solving a real-world or mathematical problem involving evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. Understand that a variable can represent an unknown number or, depending on the purpose at hand, any number in a specified set.
- Use variables to represent quantities in a real-world or mathematical problem involving evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- Use numbers, symbols, and words while analyzing and interpreting data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.
- Use variables to represent numerical data and write expressions when solving problems involved in the analysis of data about past plate motions. Understand that a variable can represent an unknown number or, depending on the purpose at hand, any number in a specified set.
- Use variables to represent quantities when analyzing data about past plate motions and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Modifications

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Unit Sequence/Essential Question: Part A: How do we know that the Earth is approximately 4.6-billion-year-old history?	
Concepts	**Formative Assessments**
• The geologic time scale is used to organize Earth's 4.6-billion-year-old history. • Rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. • The geologic time scale interpreted from rock strata provides a way to organize Earth's history. • Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. • Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	• Construct a scientific explanation based on valid and reliable evidence from rock strata obtained from sources (including the students' own experiments). • Construct a scientific explanation based on rock strata and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
Unit Sequence/Essential Question: Part B: What drives the cycling of Earth's materials?	

Concepts	Formative Assessments
● Energy drives the process that results in the cycling of Earth's materials. ● The processes of melting, crystallization, weathering, deformation, and sedimentation act together to form minerals and rocks through the cycling of Earth's materials. ● All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. ● Energy flowing and matter cycling within and among the planet's systems derive from the sun and Earth's hot interior. ● Energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. ● Explanations of stability and change in Earth's natural systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.	● Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
Unit Sequence/Essential Question: Part C: Do all of the changes to Earth systems occur in similar time scales?	
Concepts	**Formative Assessments**
● Geoscience processes have changed Earth's surface at varying time and spatial scales. ● Processes change Earth's surface at time and spatial scales that can be large or small; many geoscience processes usually behave gradually but are punctuated by catastrophic events. ● Geoscience processes shape local geographic features. ● The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. ● Interactions among Earth's systems have shaped Earth's history and will determine its future. ● Water's movements—both on the land and underground—cause weathering and erosion, which change	● Construct a scientific explanation for how geoscience processes have changed Earth's surface at varying time and spatial scales based on valid and reliable evidence obtained from sources (including the students' own experiments). ● Construct a scientific explanation for how geoscience processes have changed Earth's surface at varying time and spatial scales based on the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. ● Collect evidence about processes that change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges). ● Collect evidence about processes that change Earth's surface

the land's surface features and create underground formations. ● Time, space, and energy phenomena within Earth's systems can be observed at various scales using models to study systems that are too large or too small.	at time and spatial scales that can be small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events.
Unit Sequence/Essential Question: Part D: How is it possible for the same kind of fossils to be found in New Jersey and in Africa?	
Concepts	**Formative Assessments**
● Tectonic processes continually generate new seafloor at ridges and destroy old sea floor at trenches. ● Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. ● Patterns in rates of change and other numerical relationships can provide information about past plate motions. ● The distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions. ● Similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches) provide evidence of past plate motions.	● Analyze and interpret data such as distributions of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions. ● Analyze how science findings have been revised and/or reinterpreted based on new evidence about past plate motions.

District/School Summative Assessment Plan
Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. ● Unit Test Assessment (Earth Systems) ● Vocabulary Quiz 1/2/3 ● Teacher constructed standards based quiz Part A, Part B, Part C ● Alternative Assessment Teacher Constructed 1

OpenSciEd:

A multistate effort to develop freely accessible and open science course materials for grades 6-8.

Modifications for SpEd/ESL/Students at Risk/Gifted

● Complete fewer or different homework problems than peers
● Write shorter papers
● Supports, Accommodations, and Modifications must be provided as stated in IEP, 504 Plan, or IR&S Intervention Plan, and may include (but are not limited to) the following:

Presentation accommodations:
● Listen to audio recordings instead of reading text
● Learn content from audio books, movies, videos and digital media instead of reading print versions
● Use alternate texts at lower readability level
● Work with fewer items per page or line and/or materials in a larger print size
● Use magnification device, screen reader, or Braille / Nemeth Code
● Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
● Be given a written list of instructions
● Record a lesson, instead of taking notes
● Have another student share class notes with him
● Be given an outline of a lesson
● Be given a copy of teacher's lecture notes
● Be given a study guide to assist in preparing for assessments
● Use visual presentations of verbal material, such as word webs and visual organizers
● Use manipulatives to teach or demonstrate concepts
● Have curriculum materials translated into native language

Response accommodations:

● Use sign language, a communication device, Braille, other technology, or native language other than English

● Dictate answers to a scribe
● Capture responses on an audio recorder
● Use a spelling dictionary or electronic spell-checker
● Use a word processor to type notes or give responses in class
● Use a calculator or table of “math facts”
● Respond directly in the test booklet rather than on an answer sheet. Setting accommodations:
● Work or take a test in a different setting, such as a quiet room with few distractions
● Sit where he learns best (for example, near the teacher, away from distractions)
● Use special lighting or acoustics
● Take a test in small group setting
● Use sensory tools such as an exercise band that can be looped around a chair’s legs (so fidgety kids can kick it and quietly get their energy out)
● Use noise buffers such as headphones, earphones, or earplugs

Timing accommodations:
● Take more time to complete a task or a test
● Have extra time to process oral information and directions
● Take frequent breaks, such as after completing a task

Scheduling accommodations:
● Take more time to complete a project
● Take a test in several timed sessions or over several days
● Take sections of a test in a different order
● Take a test at a specific time of day

Organization skills accommodations:
● Use an alarm to help with time management
● Mark texts with a highlighter
● Have help coordinating assignments in a book or planner
● Receive study skills instruction

Assignment modifications:

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications:
- Learn different material
- Get graded or assessed using a different standard than the one for classmates