Grade Level / Content Area: 7th Grade Integrated Science
Length of Course: Full Year - MS
Curriculum

Course Description:
The 7th grade science program will provide students with a thorough, relevant, and engaging standards-based curriculum that focuses on implementing the scientific and engineering practices as well as the cross-cutting concepts based on the core ideas. This course will emphasize problem-based learning experiences, 21st Century Skills, and engineering design processes in a supportive, challenging environment for all students. Classroom activities will include scientific investigations, application of research, and analyzing and interpreting data.

The specific topics that will be covered are as follows:

Scientific Practices (safety, observation, & Inference, etc)
Engineering Design
Solar System
Chemistry & Energy
Photosynthesis and Cellular Respiration
Organic Compounds (carbon cycle)
Conduction, convection, and radiation (electromagnetic spectrum)Greenhouse Project Design
Oil Cost of Comfort Project Design
Genetics, Heredity & Punnett Squares
Evolution
Weather
Sassy Sandal Project Design

Big Ideas: Introduction to Scientific Practices
In this unit, students will be introduced to the Integrative Science Approach and the Scientific Practices as outlined by the NGSS.

Unit 1: Introduction to 7th Grade Integrated Science - Scientific Practices

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?* ● What steps can one take to keep safe in the science classroom? ● What are the steps in the Engineering/design process? ● What tools are essential for scientists? (Utilizing an Interactive Science Notebook) ● How is the design process used to solve a real-world problem? ● How does making observations differ from making inferences? ● How do learning styles impact choices and understanding of science content?	**Enduring Understandings** *What will students understand about the big ideas?* ● Students will understand that knowing universal science procedures promotes a safe learning environment. ● Students will understand that the design process is ongoing. ● Students will recognize how good observations lead to better inferences. ● Students will identify how to best utilize their personal learning styles to ask questions and solve problems.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: (*Enter NJCCCS or Common Core CPI's here)* MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. 5.1 Science Practices All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that	**Examples, Outcomes, Assessments** Instructional Focus: ● Utilizing an Interactive Science Notebook ● Laboratory safety ● Utilizing the Metric System ● Utilizing the design process ● Understanding personal learning styles Sample Assessments: ● Previous assessments (from 6th grade) as pre assessment before the unit ● ISN check ● Catapult Build - STEAM Activity ● Rubric for Catapult ● Quiz on Observations vs. Inferences ● STEAM Lab Report Write Up ● Engineering Sketch of Catapult Build

continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms.	Instructional Strategies: ● Introduction to Safety Equipment (Scavenger Hunt) ● Benchmark: Steps of the Engineering Process ● ISN set up and use (see Integrated Science 7 Google Site) ● Learning styles inventory http://www.kean.edu/~fosborne/E3230/E3230-04bLearningStyles.htm ● Note-taking options (Flocabulary) ● Observations vs Inference activities ● Catapult design (use Engineering process and ISN) ● How to write STEAM report ● How to work as a collaborative team - design a structure using limited materials to hold as many binders as possible Interdisciplinary Connections ● Metrics - Math ● Note Taking - All disciplines ● Critical thinking through STEAM activity - All disciplines ● Art - development of the aesthetics of the catapult build Technology Integration ● metrics (digital scale) ● podcast (freakonomics) ● iPad Global Perspectives ● How is STEAM used around the world Culturally Responsive Teaching ● Give a survey to students to assess their prior knowledge and experiences in science ● Talk about scientists who have made and are currently contributing to science (NYT Tuesdays)

Unit 2: Solar System

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?* 1. Why is there life on earth and no where else? 2. Why is the sun's energy essential to life? How do we experience the sun's every day?	**Enduring Understandings** *What will students understand about the big ideas?* ● Students will be able to explain why Earth is the only planet in our solar system that can support life. ● Students will be able to understand there are differences between the terrestrial and gas planets. ● Students will able to identify the proximity of the planets within our solar system. ● Students will be able to identify all the planets in our solar system.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. 5.4 Earth Systems Science All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe. A. Objects in the Universe: Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: ● Introduction of the Solar system ● Historical models of the solar system ● Rock, phosphorus cycle ● The main differences gas (outer) and terrestrial (inner) planets ● Describe why Earth is the only planet in our solar system that supports life ● Gravity and Magnetism Sample Assessments: ● PBL: Development of a children's story to explain the structure of the Solar System ● Quiz - Completion of a chart for Solar System ● RST - Mars Instructional Strategies: ● Power of 10 video - scale properties (layers, crust, atmosphere) ● Exploring Planet Uno Game ● Research the planets in Jigsaw Format

	• Solar System Walk - travel throughout the building to explore the scale of the solar system • Read the Dr. Suess Planet Book Interdisciplinary Connections • Distance between planets using metrics - Math • Relative Gravity on different planets-math • Creating planet books - English/Art/Technology Technology Integration • iPad • Use of Youblisher to develop children's book • Use of Notability or Google Drive to research and prepare draft of story book • Bill Nye episode • Examine, explore scientific tools used to examine space Global Perspectives • How international cooperation to explore our solar system has led to a greater understanding of Earth's role within the solar system. • International Space Station • SpaceX • Work with an astronomer via Skype; deep space scientist (astrophysicist) • Read/discuss current articles related to space Culturally Responsive Teaching • Talk about other countries' space exploration accomplishments.

UNIT 3: Chemistry & Energy

Essential Questions	**Enduring Understandings**
What provocative questions will foster inquiry, understanding, and transfer of learning? • Why is the sun's energy essential to life? • How do we experience the sun's energy	*What will students understand about the big ideas?* Students will understand that… • without the sun life could not exist. • the sun drives almost all the energy processes on

everyday? • Why are elements the building blocks of life? • How is the sun's energy converted from physical energy to chemical energy in plants? • Can matter be created or destroyed?	the Earth • all living and nonliving things are made up of elements • plants convert the sun's energy into food energy • during physical and chemical changes matter is neither created nor destroyed
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. MS-LS1-6. 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. MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. MS-PS1-5. 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. 5.4 Earth Systems Science All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe. E. Energy in Earth Systems: Internal and external sources of energy drive Earth systems. 5.2 Physical Science All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: • We are all stardust • Fusion vs. Fission • Electromagnetic spectrum - • Protons, neutrons, electrons, atomic mass • Building blocks of life - elements and the periodic table • Physical vs. Chemical Changes • Law of Conservation of Energy (food related - body Sample Assessments: • preassessment chemistry (using 6th grade assessment and our assessment combined) • fission, fusion, electromagnetic quiz • Student designed demo to explain chemical and physical properties and changes Instructional Strategies: • Neal Tyson DeGrassi video/lectures • Mini-lab with magnets (representing strength of forces) • Electromagnetic activities- uv beads, hands-on • Subatomic particles: protons, neutrons, electrons, atomic mass • Periodic Table - general characteristics of families • 9 key elements of living things/life • Research of assigned element • Calorie Lab (How many calories in a marshmallow?)* • *Law of Conservation of Energy - burning demo

A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia. B. Changes in Matter: Substances can undergo physical or chemical changes to form new substances. Each change involves energy. D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another. 5.3 Life Science All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. B. Matter and Energy Transformations: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.	• Properties of Matter - Physical vs. Chemical Changes activities (Easy Bake Oven) • Identify and describe the biological process students' research element is a part of Interdisciplinary Connections • Math - patterns through Alien Activity - creation of periodic table families • Research - all disciplines Technology Integration • iPad - identify assigned elements (3) • Tom Lehrer Element Song • video for sun video (They Must be Giants) , how elements are formed - fission/fusion • Flocabulary Notetaking (choose the style that worked best for them) Global Perspectives • Identifying compounds that can be made out of elements and how these compounds can be good or bad throughout the world. Culturally Responsive Teaching • Students will learn how scientists use the periodic table universally throughout the world.

UNIT 4: Photosynthesis and Cellular Respiration: Farm to Table PBL - Greenhouse

Essential Questions	**Enduring Understandings**
What provocative questions will foster inquiry, understanding, and transfer of learning? 1. How do we produce nutrient dense foods, while maintaining healthy ecosystems and minimal carbon footprint? 2.	*What will students understand about the big ideas?* Students will understand… • How both environmental and human activities can contribute to their personal carbon footprint. • The basic components needed to create optimal

3. What does a greenhouse look like that will optimize growing conditions for plants? 4. How do substances (pure), solutions, and mixtures differ? 5. What is the relationship between photosynthesis and cellular respiration?	growing conditions in a greenhouse ● The major differences between substances, solutions, and mixtures ● That both oxygen and carbon dioxide are involved with photosynthesis and cellular respiration
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.wetlands), and pollution (such as of the air, water, or land). MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. MS-PS1-4. 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. MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS1-6. 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.	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional focus: ● Density, Organic Compounds (CHO, fats, proteins), nitrogen cycle ● Photosynthesis ○ Review cell parts ○ Parts of a plant ○ Formula ○ Cellular Respiration ● Greenhouse design & Scaled Drawing ● Global Warming ● Conduction, convection, radiation Sample Assessments: ● Vocabulary, concept quiz density, organic compounds, chemical reactions in photosynthesis, and cellular respiration, and cell parts and functions ● Assess Engineering/Design process ● Rubric on Greenhouse ● Lab/Design Report ● Various ISN checks ● RST - Live Mas Instructional Strategies: ● Introduction to task statement ● Review collaborative-team work ● Supersize Me - video ● Review STEAM process ● Write STEAM Lab Report ● Research Greenhouse designs ● Design uses recycled materials ● Documentation of entire design process in individual ISN or iPad journal ● Collection of daily data once plant is growing ● Collection of O_2, CO_2, temperature, levels

MS-LS1-7. 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. MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. 5.2 Physical Science All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia. B. Changes in Matter: Substances can undergo physical or chemical changes to form new substances. Each change involves energy. 5.3 Life Science All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. B. Matter and Energy Transformations: Food is required for energy and building cellular materials.	• Discussion/demonstrations of conduction, convection, and radiation • Density Lab • Water Droplet Lab • Carbon Cycle Game Interdisciplinary Connections • math, measuring in metrics, scale drawings, analyzing data • english - writing up STEAM report • library - research Technology Integration • iPad • Vernier - oxygen, carbon dioxide, and temperature probes • Jimmy Fallon - design a flashlight episode • Google docs Global Perspectives • Identify how on a worldwide scale we can feed 8 billion people. Culturally Responsive Teaching • Students will be able to identify social and economic barriers that impact our ability to feed the world's population equally.

Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.	

Unit 5: Growth and Development

Essential Questions	**Enduring Understandings**
What provocative questions will foster inquiry, understanding, and transfer of learning? 1. What is DNA? 2. How are traits inherited? 3. What type of effects can mutations have on traits? 4. What is the difference between sexual and asexual reproduction? 5. How can punnett squares be used to predict the probability of trait inheritance? 6. How is the process of forming somatic cells different than forming gametes?	*What will students understand about the big ideas?* Students will understand that… ● DNA is important for growth and development ● traits can be passed on for generations ● mutations can be both helpful and harmful ● sexual reproduction requires two parents and asexual reproduction requires one parent ● the probability of inheriting a particular trait varies ● somatic cells are formed during mitosis and gametes are formed during meiosis
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* 5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. D. Heredity and Reproduction: Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: ● How cellular changes create mutations ● How traits are inherited ● Meiosis and Mitosis ● Inheritance of traits-Punnett Squares ● Mendelian genetics (general introduction Darwin, Wallace & Lamarck) Sample Assessments: ● Pre-assessment genetics ● Genetic Disorder TED type presentation - clean, supportive images, no text, graphs okay ● mini quiz - meiosis & mitosis ● Darwin, Lamarck, & Wallace contributions to the theory of evolution (introductory) Instructional Strategies: ● DNA Replication - model of DNA

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS3-1. 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. MS-LS3-2. 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. MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	• Flocabulary notetaking • Meiosis & Mitosis activities (slides, notes, iPad activities, beads) • Frankie's Flurry of phenotypes • Fossil interpretation Interdisciplinary Connections • media center research/databases • Math - probability Technology Integration • Brain POP • DNA animation websites • iPad research Global Perspectives • Students will about the Human Genome project. Culturally Responsive Teaching • "practical benefits that can be applicable in society. Knowledge about the effects of DNA variations between individuals can lead to revolutionary new ways to diagnose, treat, and someday prevent the thousands of disorders that affect us. As well as providing clues to understanding human biology, learning about non-human organisms' DNA sequences can lead to an understanding of their natural capabilities that can be utilized and applied toward solving challenges in health care, energy sources, and environment cleanup." Human Genome Project

UNIT 6: Ecosystem Dynamics (PBL: Oil - Cost of Comfort)

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?* 1. How can we describe the differences between symbiotic & interdependent relationships? 2. How do humans impact (aquatic and terrestrial) ecosystems? 3. How does humans dependence on natural resources change the balance of an ecosystem?	**Enduring Understandings** *What will students understand about the big ideas?* Students will understand that… ● species survival is dependent upon them interacting/using other species ● humans can both positively and negatively impact aquatic and terrestrial ecosystems ● our fossil fuel supply is forever decreasing ● extracting fossil fuels destroys terrestrial and aquatic food chains/food webs
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-LS2-3.. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: ● symbiotic and interdependent relationships ● Human use of water, air, soil and the impact on ecosystems (renewable/nonrenewable) resources ● Human use/dependence on oil and oil products as it impacts the balance of an ecosystem ● Biodiversity Sample Assessments: ● Instant poll - what students use that contain oil or oil products ● Creation of Oil Spill clean up "tool" ● Create a documentary to educate the public about the true cost of fossil fuels Instructional Strategies: ● Introduction of task statement (Oil-the cost of comfort) ● "Disaster in the Gulf - a Race Against Time" (intro) ● Fusion Text- Matter and Energy ● Human interaction/dependence on water, air, soil, oil & oil products ● Density (revisited) water (salt, fresh, cold, hot) ● Cycles - living/non-living things (CO, water, N, P) ● Chemical/physical changes

5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity,
and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.
 	
C. Interdependence: All animals and most plants depend on both other organisms and their environment to meet
their basic needs.
 	
5.4.C. Properties of Earth Materials: Earth's composition is unique, is related to the origin of our solar system, and
provides us with the raw resources needed to sustain life.
	• Research:
	  ○ 1 worldwide oil disasters
	  ○ 1 major coal, gas disaster
	  ○ How oil, coal, natural gas are extracted
	  ○ How oil transported
	  ○ How is oil refined
	  ○ Major uses of oil
	  ○ What countries export of oil
	• Design "tool" to clean up an actual oil spill using constraints (materials, "cost", etc)
	• Team building, collaboration
	
	Interdisciplinary Connections
	• Library/media center research
	• Writing - note-taking, creating script for documentary, keeping track of design process - ideas, etc in ISN
	• Math - collection of data when testing Oil clean-up tool
	  ○ analysis of data - use of oil and oil products
	  ○ calculation of density of different types of water
	
	Technology Integration
	• iPad for research
	• iPad to create documentary
	• iPad to document the process of the tool creation
	• Video of Oil Disaster(s)
	• STEAM design of tool
	
	Global Perspectives
	• see research piece - oil use, procurement around the globe and how ecosystems (all over the world) are affected
	
	Culturally Responsive Teaching
	• Students will be able to identify social and economic barriers, related to oil, that impact the ecosystems around the world and how it affects different populations.

UNIT 7: Ecosystem Dynamics: The Biosphere

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?* 1. Why is Earth the only planet we know of that sustains life (has a biosphere)? 2. What are the major components of our Biosphere? 3. How do we depend on, interact with and hurt our Biosphere? (How can we describe the differences between symbiotic & interdependent relationships?) 4. Why is biodiversity important in an ecosystem?	**Enduring Understandings** *What will students understand about the big ideas?* Students will understand that… ● Earth is a unique planet. ● The biosphere is fragile and complex ● Humans interact with, are sustained by, and damage the Biosphere.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. 5.3 Life Science: Life science principles are powerful conceptual tools for making sense of	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: ● Properties of Earth that sustain life ● Ways biodiversity is important in an ecosystem ● How symbiotic and interdependent relationships interact within an ecosystem to create biodiversity Sample Assessments: ● Assessment of vocabulary and concepts related to ecosystems, biodiversity ● Design of a "Biome in a Bottle" ● ISN entries that show understanding of concepts Instructional Strategies: ● Research Biosphere II ● Describe/explain what makes an ecosystem diverse ● Student's design own "biosphere" to include symbiotic & interdependent relationships, properties that would sustain life (plants, insects or other small animals) ● Activities related to biosphere (john)

the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. C. Interdependence: All animals and most plants depend on both other organisms and their environment to meet their basic needs. 5.4.C. Properties of Earth Materials: Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.	Interdisciplinary Connections ● Library media - research ● STEAM design Technology Integration ● iPads for research, design ideas Global Perspectives ● Allows for the study and manipulation of a biosphere without harming Earth and also for the potential use of biospheres in space colonization ● Create awareness of principles and concepts of biodiversity and how it is important to create sustainable, biodiverse systems Culturally Responsive Teaching ● Being aware of the importance of a balanced ecosystem, for every cultures' inhabitants is to be an integral part of maintaining that balance

Unit 8: Weather

Essential Questions	**Enduring Understandings**
What provocative questions will foster inquiry, understanding, and transfer of learning? 1) How can studying local weather patterns better predict future weather conditions? 2) What is the correlation between local and global weather patterns? 3) What do the weather symbols used by meteorologists represent?	*What will students understand about the big ideas?* Students will understand that… ● weather forecasts not only predict future weather conditions but can also be used to protect, life, property, and agriculture ● global and local weather patterns are dependent on each other ● weather symbols are a simplified way to represent a wide variety of weather conditions

4) How do humans influence climate change?	• taking care of terrestrial, aquatic, and atmospheric environments can have positive effects on climate
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)* **MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.** **MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.** **MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates** **5.4 Earth Systems Science: All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.** **F. Climate and Weather: Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.**	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: • weather forecasts • local and global weather trends • identifying weather symbols • identifying ways humans can make a positive impact on weather conditions Sample Assessments: • students create their own weather forecast for a particular region of the world using iMovie • quiz - analyzing weather maps Instructional Strategies: • viewing weather segments in different languages to challenge their ability to interpret weather symbols • weather symbols bingo • guided notes • interpreting weather maps • analyzing weather patterns over extended period of time Interdisciplinary Connections • Math/Social Studies - reading maps • Math - following patterns • Library - research Technology Integration • iPad • Watching weather segments • Weather channel Global Perspectives • Students learn about situations in which the world came together to help countries devastated by a natural weather disaster. Culturally Responsive Teaching

	• Students learn how weather symbols break down language barriers between meteorologists around the world.

NOTE re: Examples, Outcomes and Assessments

The following skills and themes should be reflected in the design of units and lessons for this course or content area.

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy