Course Name:	5th Grade Science		
Credits:	n/a		
Prerequisites:	n/a		
Description:	General Education 5th Grade Science Curriculum		
Academic Standards:	Next Generation Science Standards		
Units:	**Unit Length:**	**Unit Standards:**	**Unit Outcomes:**
Earth and Sun	43 Sessions	5-ESS1-2 5 -PS2-1 5-ESS1-2 5-PS1-1 5-ESS2-1 5-ESS2-2	Shadows change because of the Sun's position and how it changes in the sky. Day is when half of the Earth's surface is illuminated by sunlight and night is when half of the Earth's surface is in its own shadow. The solar system includes the Sun and other objects that orbit it, including Earth, the Moon, other planets, satellites, and smaller objects. Gravity is the force that keeps the planets and other objects in orbit. Air is a mixture of gases held by gravity near Earth's surface. Earth's atmosphere has different layers and most of the air is found in the troposphere. Evaporation and condensation contribute to the movement of water through the water cycle, redistributing water over Earth's surface. The Sun's energy drives the weather.
Living Systems	14 Sessions	5-ESS2-1 5-LS2-1	A system is a collection of interacting parts that together constitute a whole or perform a function. Systems are often composed of subsystems. Earth can be described as the interaction of four earth systems: the rocky part (the geosphere), the atmosphere, the water (the hydrosphere), and the complexity of living organisms (the biosphere). Food webs are subsystems within ecosystems. They describe the transfer of matter and energy within the system. Food webs are made up of producers (organisms that make their own food), consumers (organisms that eat other organisms to obtain food), and decomposers (organisms that consume and recycle dead organisms and organic waste).
Mixtures and Solutions	27 Sessions	5-PS1-1 5-PS1-2 5-ETS1-1 5-ETS1-2 5-ETS1-3 5-PS1-1 5-PS1-2 5-PS1-3 5-ETS1-1 5-ETS1-2 5-PS1-4	A mixture is two or more materials together. Mixtures can be separated into the materials used to make the mixture. The mass of a mixture is equal to the mass of its parts. A solution is a mixture in which a substance dissolves in water to make a transparent liquid. Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).

Unit Name: **Earth and Sun**	**Length:** 43 sessions
Standard(s): 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 5 -PS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen. 5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	**Outcomes:** Shadows change because of the Sun's position and how it changes in the sky. Day is when half of the Earth's surface is illuminated by sunlight and night is when half of the Earth's surface is in its own shadow. The solar system includes the Sun and other objects that orbit it, including Earth, the Moon, other planets, satellites, and smaller objects. Gravity is the force that keeps the planets and other objects in orbit. Air is a mixture of gases held by gravity near Earth's surface. Earth's atmosphere has different layers and most of the air is found in the troposphere. Evaporation and condensation contribute to the movement of water through the water cycle, redistributing water over Earth's surface. The Sun's energy drives the weather.
Topic 1: **The Sun**	**Length:** 11 sessions
Standard(s): 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	**Academic Vocabulary:** Axis, Compass, Day, Night, North Pole, North Star, Orbit, Orientation, Revolution, Rotation Shadow, Sun, Sunrise, Sunset
Essential Questions: How and why does your shadow change during the day? What can be learned by studying the length and direction of shadows? What causes day and night?	**Learning Targets:** The student will understand that shadows are the dark areas that result when light is blocked. The student will learn that shadows change during the day because the position of the Sun changes in the sky. The student will discover that the length and direction of a shadow depends on the Sun's position in the sky. The student will know that day is the half of Earth's surface being illuminated by sunlight, night is the half of Earth's surface in its own shadow.
Lesson Frame: Shadow Shifting	I can understand how and why my shadow changes during the day.
Lesson Frame: Sun Tracking	I can learn that shadows change because of the position of the Sun and how it changes in the sky.
Lesson Frame: Day and Night	I can discover what causes day and night.

Performance Tasks: Survey Benchmark Assessment Notebook entries Analyze and discuss text Investigation 1 I-Check Assessment	**Notes:** Science Resources Book: "Changing Shadows", "Sunrise and Sunset" Online Activities: "Shadow Tracker", "Tutorial: Sun Tacking", "Seasons" Videos from Earth and Sun T.E. Student copies of Earth and Sun text FOSS kit materials I Check Assessment Student Science Notebooks
Topic 2: Planetary Systems	**Length:** 21 sessions
Standard(s): 5 -PS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	**Academic Vocabulary:** asteroid, asteroid belt, comet, constellation, crescent Moon, dwarf planet, first-quarter Moon, force, full Moon, gas giant planet, gibbous Moon, gravity, Kuiper belt, lunar cycle, Moon, night sky, new Moon, phase, planet,solar system, star, terrestrial planet, third-quarter Moon, waning Moon, waxing Moon
Essential Questions: How can you explain why we see some natural objects only in the night sky, some only in the day sky, and some at both times? How would you describe the size of and distance between Earth, the Moon, and the Sun? How does the shape of the Moon change over 4 weeks? How do the parts of the solar system interact? Why do stars appear to move across the night sky?	**Learning Targets:** The student will learn that the solar system includes the Sun and the objects that orbit it, including Earth, the Moon, seven other planets, their satellites, and smaller objects. The student will understand that the Moon is much smaller than the Earth and orbits at a distance equal to about 30 Earth diameters. The student will learn that the Sun is 12,000 Earth diameters away from Earth and is more than 100 times larger than Earth. The student will understand that the pulling force of gravity keeps the planets and other objects in orbit by continuously changing their direction of travel. The student will know that a great deal of light travels through space to Earth from the Sun and from distant stars. The student will learn that stars are at different distances from Earth. The student will learn that stars are different sizes and have different brightnesses.
Lesson Frame: Night-Sky Observations	I can explain why I see some natural objects only in the night sky, some only in the day sky, and some at both times.
Lesson Frame: How Big and How Far?	I can describe the size and distance between Earth, the Moon, and the Sun.
Lesson Frame: Phases of the Moon (optional)	I can describe the phases of the Moon and why the shape of the moon changes every 4 weeks.
Lesson Frame: The Solar System	I can analyze and interpret data about the interaction of the parts of the solar system.
Lesson Frame: Stars	I can learn that stars are at different distances from Earth. I can determine that stars are different sizes and have different brightnesses.

Performance Tasks: Performance Assessment Notebook entries Analyze and discuss text Investigation 2 I-Check Assessment	Notes: Science Resources Book: The Night Sky, Looking through Telescopes, Comparing the Size of the Earth and the Moon, Apollo 11 Space Mission, How Did Earth's Moon Form?, Exploring the Solar System, Planets of the Solar System, Why Doesn't Earth Fly Off into Space?, Stargazing, Star Scientists, Our Galaxy Online Activities: Lunar Calendar, Star Maps, Stellar Motions Videos from Earth and Sun T.E. Student copies of Earth and Sun text FOSS kit materials I Check Assessment
Topic 3: **Earth's Atmosphere**	**Length:** 4 sessions
Standard(s): 5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen. 5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	**Academic Vocabulary:** air, air pressure, atmosphere, barometer, compress, hygrometer, mass, matter, troposphere, weather
Essential Questions: What is air? What is Earth's atmosphere?	**Learning Targets:** The student will understand that air is a mixture of gases held by gravity near Earth's surface. The student will understand that air has mass, takes up space, and is compressible. The student will determine that most of Earth's air resides in the troposphere, the layer of the atmosphere closest to Earth's surface. The student will understand that weather happens in the troposphere.
Lesson Frame: The Air Around Us	I can define air as a mixture of gases held by gravity near Earth's surface. I can explain that air has mass, takes up space, and is compressible.
Lesson Frame: The Atmosphere	I can recognize that Earth's atmosphere has different layers and most of the air is found in the troposphere.

Performance Tasks: Performance Assessment Notebook entries Analyze and discuss text Investigation 3 I-Check Assessment	**Notes:** Science Resources Book: What is Air, Earth's Atmosphere Online Activities: Tutorial: Air and Atmosphere Videos from Earth and Sun T.E. Student copies of Earth and Sun text FOSS kit materials I Check Assessment Student Science Notebooks
Topic 4: **Water Planet**	**Length:** 7 sessions
Standard(s): 5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen. 5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	**Academic Vocabulary:** climate, climatologist, condensation, condense, dew, drought, evaporate, evaporation, fog, fresh water, glacier, groundwater, hurricane, ice cap, lake, ocean, recycle, river, saltwater, severe weather, thunderstorm, tornado, water cycle, water vapor
Essential Questions: What causes condensation to form? How does water vapor get into the air? What is the water cycle?	**Learning Targets:** The student will define condensation as the process by which gas (water vapor) changes into liquid (water). The student will identify evaporation as the process by which liquid changes into gas. The student will recall that as temperature increases, the rate of evaporation increases. The student will recognize that most of Earth's water (97%) is salt water in the ocean and that Earth's freshwater is found in many locations including the atmosphere, lakes and rivers, soil, ground ice, groundwater, and glaciers. The student will determine that evaporation and condensation contribute to the movement of water through the water cycle, redistributing water over Earth's surface. The student will recognize that the Sun's energy drives weather.
Lesson Frame: Water Cycle	I can draw and label a model of the water cycle.
Lesson Frame: Condensation	I can explain what causes condensation to form.
Lesson Frame: Evaporation	I can determine how water vapor gets into the air.

Performance Tasks:	**Notes:**
Performance Assessment Notebook entries Analyze and discuss text Posttest	Science Resources Book: Condensation, Where is Earth's Water?, The Water Cycle Online Activities: Water Cycle Game Videos: Water Cycle Student copies of Earth and Sun text FOSS kit materials I Check Assessment Student Science Notebooks

Unit Name: **Living Systems**	**Length:** 14 sessions
Standards: 5-ESS2-1 Model of 4 Earth's spheres interactions 5-LS2-1 Model of matter in an environment	**Outcomes:** A system is a collection of interacting parts that together constitute a whole or perform a function. Systems are often composed of subsystems. Earth can be described as the interaction of four earth systems: the rocky part (the geosphere), the atmosphere, the water (the hydrosphere), and the complexity of living organisms (the biosphere). Food webs are subsystems within ecosystems. They describe the transfer of matter and energy within the system. Food webs are made up of producers (organisms that make their own food), consumers (organisms that eat other organisms to obtain food), and decomposers (organisms that consume and recycle dead organisms and organic waste).
Topic 1: **Systems**	**Length:** 14 sessions
Standard(s): 5-ESS2-1 Model of 4 Earth's spheres interactions 5-LS2-1 Model of matter in an environment	**Academic Vocabulary:** aquatic ecosystem, algae, atmosphere, bacteria, biosphere, carnivore, compost, consumer, decomposer, ecosystem, energy, food chain, food web, freshwater ecosystem, geosphere (lithosphere), herbivore, hydrosphere, interact, kelp forest, living, marine ecosystem, microorganism, nonliving, omnivore, phytoplankton, predator, prey, producer, recycle, redworm, subsystem, system, terrestrial ecosystem, zooplankton
Essential Questions: How can you identify a system? Is planet Earth a system? What organisms are both predators and prey in the kelp forest ecosystems? What happens when compost worms interact with organic litter?	**Learning Targets:** A system is a collection of interacting objects, ideas, and/or procedures that together define a physical entity or process. A subsystem is a small system that is inside a larger system. Earth can be described as the interaction of four earth systems: the rocky part (the geosphere), the atmosphere, the water (the hydrosphere), and the complexity of living organisms (the biosphere). Food webs are subsystems within ecosystems. They describe the transfer of matter and energy within the system. A kelp forest has similarities to a rainforest (vertical layering). Phytoplankton are the major producers in most aquatic systems. Food webs and competition for resources exist in marine systems. Food webs are made up of producers (organisms that make their own food), consumers (organisms that eat other organisms to obtain food), and decomposers (organisms that consume and recycle dead organisms and organic waste).
Lesson Frame: Everyday Systems	I can tell a subsystem within a larger system.
Lesson Frame: The Earth System	I can develop and create a model to describe the interaction between geosphere, atmosphere, hydrosphere, and biosphere proving Earth is a system. I can explain the difference between a food chain and a food web. I can categorize producers, consumers, and decomposers.
Lesson Frame: Kelp Forest Food Web	I can understand competition for resources. I can develop and create a model to describe the movement of matter among plants, animals, decomposers, and the environment.
Lesson Frame: Recycling	I can describe a decomposers role as a recycler in the ecosystem. I can assemble a worm habitat to show decomposition in nature.

Performance Tasks: Survey Benchmark Assessment Notebook entries Analyze and discuss text Create Worm Habitats Investigation 1 I-Check Assessment	Notes: Science Resources Student book, read "Introduction to Systems", "Is Earth a System?", "The Biosphere", "Monterey Bay National Marine Sanctuary", "Comparing Aquatic and Terrestrial Ecosystems", "Nature's Recycling System" FOSS videos: "Physical Systems", "Web of Life: Life in the Sea" Food web cards, from FOSS kit Performance Assessment Checklist (for worm activity) Online activities: "Food Webs" simulation and can create additional food webs in different ecosystems FOSS kit materials

Unit Name: **Mixtures and Solutions**	**Length:** 27 sessions
Standards: 5-PS1-1 5-PS1-2 5-ETS1-1 5-ETS1-2 5-ETS1-3 5-PS1-1 5-PS1-2 5-PS1-3 5-ETS1-1 5-ETS1-2 5-PS1-4	**Outcomes:** A mixture is two or more materials together. Mixtures can be separated into the materials used to make the mixture. The mass of a mixture is equal to the mass of its parts. A solution is a mixture in which a substance dissolves in water to make a transparent liquid. Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).
Topic 1: **Separating Mixtures**	**Length:** 12 sessions
Essential Questions: How can a mixture be separated? Where does the solid material go when a solution is made? How can you separate a mixture of dry materials? Are there materials outdoors that will dissolve in water?	**Learning Targets:** A mixture is two or more materials intermingled. An aqueous solution is a mixture in which a substance disappears (dissolves) in water to make a clear liquid. Mixtures can be separated into their constituents. The mass of a mixture is equal to the mass of its constituents. Mixtures can be separated into their constituents. Mixtures and solutions can be separated, using screens, filters, and evaporation. Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). A mixture is two or more materials intermingled. An aqueous solution is a mixture in which a substance disappears (dissolves) in water to make a clear liquid.
Standard(s): 5-PS1-1 5-PS1-2 5-ETS1-1 5-ETS1-2 5-ETS1-3	**Academic Vocabulary:** constraint, criteria, crystal, diatomaceous earth, dissolve, engineer, evaporation, extract, filter, gravel, magnet, mass, mixture, powder, property, salt, screen, separate, solute, solution, solvent, transparent
Lesson Frame: Making and Separating Mixtures	I can define the word mixture. I can formulate a mixture of different materials. I can utilize appropriate tools to separate a mixture. I can restate that a solution can't be separated the same as a solids mixture.
Lesson Frame: Separating a Salt Solution	I can recognize that mixtures can be broken down into constituent parts. I can infer and then design an investigation to see where salt has gone, while mass remains the same.

Lesson Frame: Separating a Dry Mixture	I can design a solution to a problem and test my design.
Lesson Frame: Outdoor Solutions	I can test natural items to see if they create solutions. I can experiment with separation methods on created solutions.
Performance Tasks: Survey Benchmark Assessment Student notebook entries Predicting and designing an investigation Investigation 1 I-Check Assessment	Notes: copy: *Mixtures, Separations* workbook entries online activities: *Tutorial: Mixtures, Tutorial: Solutions, Separating Mixtures, Virtual Investigation: Separating Mixtures* Resources book: "Mixtures", "Taking Mixtures Apart", "Science Practices", "Engineering Practices", "Extracts", "The Story of Salt" (optional) FOSS video: *Elements, Compounds, and Mixtures,* Materials from the FOSS kits in science lab Response Sheet- Investigation 1 (assess in Part 2) Performance Assessment Checklist (assess in Part 3) Review Outdoor Safety
Topic 2: **Reaching Saturation**	**Length:** 13 sessions
Essential Questions: Is there a limit to the amount of salt that will dissolve in 50 mL of water? Does it always take the same amount of solid materials to saturate 50 mL of water? What is the identity of the mystery substance? What is in our water sample? What is a design to remove salt from ocean water?	**Learning Targets:** A solution is saturated when as much solid material as possible has dissolved in the liquid. Solutions are composed of a solvent (liquid) and a solute (solid); the solute is dissolved in the solvent. A solution is saturated when as much solid material as possible has dissolved in the liquid. Solubility is the property that indicates how readily a solute dissolves in a solvent. Solubility varies from substance to substance and is affected by kind of solvent, temperature, and other factors. Solubility is the property that indicates how readily a solute dissolves in a solvent. A substance is a single, pure material. Substances form predictable, identifiable crystals when solutions evaporate. Apply techniques used to separate mixtures and solutions.
Standard(s): 5-PS1-1 5-PS1-2 5-PS1-3 5-ETS1-1 5-ETS1-2	**Academic Vocabulary:** citric acid, Epsom salts, insoluble, saturated solution, soluble, solubility, substance, supersaturated
Lesson Frame: Salt Saturation	I can report that a solution is saturated when as much solid material as possible has dissolved in the liquid.
Lesson Frame: Epsom Salt Saturation	I can restate that solubility is the property that indicates how readily a solute dissolves in a solvent. I can recall that solubility varies from substance to substance and is affected by kind of solvent, temperature, and other factors.
Lesson Frame: The Saturation Puzzle	I can cite examples of substances that are pure materials. I can formulate and carry out a plan to identify an unknown substance. I can illustrate that substances form predictable, identifiable crystals when solutions evaporate.

Lesson Frame: What's in Your Water?	I can utilize tools and techniques to test local water quality. I can clearly communicate my design ideas.
Performance Tasks: Student notebook entries Participate in salt-and-bottle activity Engage in argumentation/provide evidence to support their claim. Devise a solution to remove dissolved salt water. Investigation 4 I-Check Assessment	Notes: **Student Resource Book:** "The Bends", "A Sweet Solution", "Sour Power", "East Bay Academy for Young Scientists", "Drinking Ocean Water", "Creative Solutions", **videos:** *The Water Cycle* **Online Activities:** "Tutorial: Saturation", "Virtual Investigation: Solubility" Response Sheet-Investigation 4 (notebook sheet 15) for assessing part 2 Performance Assessment Checklist- for part 3
Topic 3: **Fizz Quiz**	**Length:** 2 sessions
Essential Questions: What is the effect of mixing two substances with water?	**Learning Targets:** Some mixtures of substances result in a chemical reaction. During reactions, starting substances (reactants) change into new substances (products). Formation of a gas or precipitate is evidence of a chemical reaction.
Standard(s): 5-PS1-4	**Academic Vocabulary:** Investigation 5: Fizz Quiz baking soda, calcium chloride, gas, carbon dioxide, precipitate, chemical reaction, products, reactants
Lesson Frame: Chemical Reactions	I can demonstrate that some mixtures of substances result in a chemical reactions. I can repeat that during a reaction, starting substances (reactants) change into new substances (products). I can report that formation of a gas or precipitate is evidence of a chemical reaction.
Performance Tasks: Student notebook entries Carry out an investigation Analyze and Interpret data	Notes: **online activities:** "Fizz Quiz" **Resources book:** "Ask a Chemist" Materials from the FOSS kits in science lab