

Course Name:	6th Grade Science		
Credits:	N/A		
Prerequisites:	N/A		
Description:	Students will explore weather through focusing on the causes and effects of wind and water on the environment and the impact of global warming upon the Earth. Students will explore organisms focusing on both internal and external structures that produce and affect life. Students will explore robotics focusing on the force and energy necessary for operation, the design and coding aspects, and the advancements and contributions to society.		
Academic Standards:	Next Generation Science Standards		
Units:	Unit Length:	Unit Standards:	Unit Outcomes:
Weather and Water	48 sessions	MS.ESS1.1 MS.ESS2.4 MS.ESS2.5 MS.ESS2.6 MS.ESS3.2 MS.ESS3.4 MS.ESS3.5	Weather is the product of predictable patterns and circumstances. Climate is the average weather collected over time. Climate changes over time due to natural Earth cycles and human-induced changes.
Diversity of Life	60 sessions	MS.LS1.1 MS.LS1.2 MS.LS1.3 MS.LS1.4 MS.LS1.5 MS.LS1.6 MS.LS1.7 MS.LS3.2	All living things are made of cells. All organisms exhibit common characteristics and have certain requirements. Plants reproduce in a variety of ways. Genes are responsible for an organism's traits. Asexual reproduction results in offspring with identical genetic information. Sexual reproduction results in offspring with genetic variation, similar to parents but not identical. Organisms have structures and behaviors that enhance their chances of surviving and reproducing in their environment. Biodiversity is the wide range of existing life-forms that have adapted to the variety of conditions on Earth.
Robotics	24 sessions	MS.PS2.2 MS. PS2.3 MS.PS2. 5 MS.PS3.2 MS. PS3.5 MS. ESS3.4 MS. ETS1.1 MS. ETS1.2 MS. ETS1.3 MS. ETS1.4	Force is a push or pull. Friction is a force that acts to oppose a force acting to put a mass in motion. Magnets have two poles; like poles repel and opposite poles attract. Magnets are surrounded by an invisible magnetic force field that acts through space and through all nonmagnetic materials. Energy cannot be created or destroyed, only transferred. Energy sources are either renewable or nonrenewable. Coding is used to allow robots to act without manual control. Technological advancements contribute to our society. Technological advancements are increasing at an alarming rate. Force and friction are both factors that affect robot coding.

Unit Name: Weather and Water	Length: 48 sessions
Standards: MS.ESS1.1 MS.ESS2.4 MS.ESS2.5 MS.ESS2.6 MS.ESS3.2 MS.ESS3.4 MS.ESS3.5	Outcomes: Weather is the product of predictable patterns and circumstances. Climate is the average weather collected over time. Climate changes over time due to natural Earth cycles and human-induced changes.
Topic 1: What is Weather?	Length: 4 sessions
Standard(s): MS.ESS2.4 MS.ESS2.5 MS.ESS3.2	Academic Vocabulary: air pressure, climate, forecast, humidity, meteorologist, meteorology, precipitation, prediction, severe weather, temperature, weather, wind
Essential Questions: What is weather? How can we measure the weather?	Learning Targets: Students will learn that weather is the condition of Earth's atmosphere at a given time in a given place. Students will understand that severe weather has the potential to cause death and destruction in the environment. Students will identify meteorology as the science of weather, and meteorologists are the people who study Earth's weather. Students will comprehend that weather and climate are different.
Lesson Frame: Into the Weather	I can explain the difference between weather and climate.
Lesson Frame: Local Weather	I can identify the different ways to measure the weather of any location.
Performance Tasks: Science notebook entries Observations	Notes:
Topic 2: Where's the Air?	Length: 4 sessions
Standard(s): MS.ESS2.5	Academic Vocabulary: air, atmosphere, compress, exosphere, expand, mass, matter, mesosphere, particle, permanent, gas, pressure, state, stratosphere, thermosphere, troposphere, variable gas, weight

Essential Questions: What is air? What is the atmosphere?	Learning Targets: Students understand the air is matter; it occupies space, has mass, and can be compressed. Students will learn that the atmosphere is the layers of gases surrounding Earth. Students will identify that weather happens in the troposphere, the layer of the atmosphere closest to Earth's surface. Students will recognize that the troposphere is a mixture of nitrogen, oxygen, and other gases, including argon, carbon dioxide, and water vapor.
Lesson Frame: The Air around Us	I can prove that air is matter and it occupies space, has mass, and can be compressed.
Lesson Frame: Earth's Atmosphere	I can identify the various layers of the atmosphere and their compositions.
Performance Tasks: Science notebook entries Observations Investigation 1-2 I-Check	Notes:
Topic 3: Air Pressure and Wind	Length: 3 sessions
Standard(s): MS.ESS2.5	Academic Vocabulary: atmospheric pressure, bar, barometer, density, equilibrium, isobar, kinetic energy, millibar (mb)
Essential Questions: How does pressure affect air? What happens when two areas of air have different pressures?	Learning Targets: Students will comprehend that pressure exerted on a gas reduces its volume and increases its density. Students will understand that wind is a large-scale movement of air. Students will learn that air tends to move from regions of high pressure to regions of low pressure. Students will identify that air pressure is represented on a map by contour lines called isobars.
Lesson Frame: Air-Pressure Inquiry	I can demonstrate how pressure affects air.
Lesson Frame: Pressure Maps	I can identify the isobars on a pressure map. I can explain how pressure creates wind.
Performance Tasks: Science notebook entries Observations Investigation 3 I-Check	Notes:
Topic 4: Convection	Length: 6 sessions
Standard(s): MS.ESS2.6	Academic Vocabulary: convection, convection cell, energy transfer, fluid, model

<p>Essential Questions: What is the relationship between layering of fluids and density? How does heat affect density of fluids? How do gases flow in the atmosphere</p>	<p>Learning Targets: Students will understand that density is the ratio of a mass to its volume. Students will recognize that if two solutions have equal volumes but differ in mass, the one with the greater mass is more dense. Students will learn that as matter heats up, it expands, causing the matter to become less dense. Students will identify that convection is the circulation of fluid that results from energy transfer; relatively warm masses rise and relatively cool masses sink.</p>
Lesson Frame: Density of Fluids	I can compare the density of various matters and/or solutions to identify what will float or sink.
Lesson Frame: Convection of Water	I can explain how the variation of temperature within a fluid causes convection within that fluid.
Lesson Frame: Convection of Air	I can explain how the variation of temperature within a gas causes convection within that gas.
<p>Performance Tasks: Science notebook entries Observations Investigation 4 I-Check</p>	Notes:
Topic 5: Heat Transfer	Length: 6 sessions
<p>Standard(s): MS.ESS1.1 MS.ESS2.6</p>	<p>Academic Vocabulary: absorb, climatologist, climatology, differential heating, evidence, heat, latitude, radiant energy, radiation, ray, solar angle, wave</p>
<p>Essential Questions: How does weather differ between locations? How does the Sun affect the temperature of locations on Earth? What factors affect the surface temperature on Earth?</p>	<p>Learning Targets: Students will determine that latitude is a factor that affects local weather and climate. Students will recognize that the angle at which light from the Sun strikes the surface of Earth is the solar angle. Students will understand that the lower the solar angle is, the less intense the light is on Earth's surface. Students will recognize that the sun is the major source of energy that heats the atmosphere, and solar energy is transferred by radiation. Students will determine that heat is the increase of kinetic energy of particles.</p>
Lesson Frame: Latitude	I can explain how latitude affects weather and climate.
Lesson Frame: Solar Angle	I can demonstrate how solar angle affects affects weather and climate.
Lesson Frame: Heating Earth	<p>I can explain how radiation heats the earth. I can demonstrate how heat is the result of kinetic energy of particles.</p>
<p>Performance Tasks: Science notebook entries Observations Investigation 5 I-Check</p>	Notes:
Topic 6: Air Flow	Length: 4 sessions

Standard(s): MS.ESS2.5 MS.ESS2.6	Academic Vocabulary: air mass, conduction, Coriolis effect, jet stream, land breeze, prevailing winds, sea breeze
Essential Questions: How does the atmosphere heat up? How does energy from the Sun affect wind on Earth? What affects the direction of global winds?	Learning Targets: Students will determine that energy can move from one material to another by conduction. Students will learn that differential heating of Earth's surface by the Sun can create high- and low-pressure areas. Students will recognize that local winds blow in predictable patterns determined by local differential heating. Students will understand that convection cells and Earth's rotation determining prevailing winds on Earth.
Lesson Frame: Conduction	I can explain how energy transfers from one material to another through conduction.
Lesson Frame: Local Winds	I can explain how differential heating causes predictable wind patterns.
Lesson Frame: Global Winds	I can identify the predictable wind patterns caused by the rotation of the earth and convection cells.
Performance Tasks: Science notebook entries Observations Investigation 6 I-Check	Notes:
Topic 7: Water in the Air	Length: 7 sessions
Standard(s): MS.ESS2.4	Academic Vocabulary: condensation, condensation nucleus, dew point, evaporation, precipitation, saturated, transpiration
Essential Questions: Is there water vapor in the air? How does energy transfer when water changes phases? What causes clouds to form?	Learning Targets: Students will determine that water changes from gas to liquid by condensation. Students will verify that water changes from liquid to gas (vapor) by evaporation. Students will recognize that temperature change, which is evidence of energy transfer, accompanies evaporation. Students will learn that the dew point is the temperature at which air is saturated with water vapor and vapor condenses into liquid. Students will recognize that increasing the pressure of a given volume of air increases the temperature of air.
Lesson Frame: Is Water Really There?	I can demonstrate how condensation occurs.
Lesson Frame: Phase Change and Energy Transfer	I can explain how temperature affects the physical state of gases and liquids.
Lesson Frame: Clouds and Precipitation	I can describe how clouds are formed and the point at which precipitation will occur.

Performance Tasks: Science notebook entries Observations Investigation 7 I-Check	Notes:
Topic 8: Meteorology	Length: 5 sessions
Standard(s): MS.ESS2.5 MS.ESS2.6 MS.ESS3.2	Academic Vocabulary: cold front, radiosonde, warm front
Essential Questions: Why are data from weather balloons important? What information can you get from a weather map?	Learning Targets: Students will learn that weather balloons travel high in the atmosphere and collect physical data using a radiosonde. Students will understand that the data from weather-balloon radiosonde can be used to determine dew point and the likelihood of clouds forming. Students will recognize that weather maps combine many kinds of atmospheric and surface data, including pressure, temperature, wind direction, wind speed, and precipitation. Students will identify that fronts are areas where large air masses collide.
Lesson Frame: Weather Balloons	I can describe what information is collected by weather balloons and its purpose.
Lesson Frame: Weather Maps	I can use weather maps to make predictions about the weather.
Performance Tasks: Science notebook entries Observations	Notes:
Topic 9: The Water Planet	Length: 5 sessions
Standard(s): MS.ESS2.4 MS.ESS2.6 MS.ESS3.4	Academic Vocabulary: El Niño, groundwater, gyre, ocean current, salinity, water cycle
Essential Questions: What is the water cycle? What affects the direction that ocean water flows? How does the ocean affect climate on land?	Learning Targets: Students will learn that most of Earth's water is saltwater in the ocean, and Earth's freshwater is found in many locations. Students will demonstrate that a water particle might follow many different paths as it travels in the water cycle. Students will understand that ocean currents are caused primarily by winds, convection of ocean water, and the Coriolis effect. Students will recognize that a location's proximity to a large body of water generally results in less temperature variation and more precipitation.

Lesson Frame: Water-Cycle Simulation	I can create a diagram of the water cycle. I can explain how the water cycle is a complex system.
Lesson Frame: Ocean Currents	I can use my knowledge of air currents and land masses to determine ocean currents.
Lesson Frame: Ocean Climates	I can describe how the ocean affects climate on land.
Performance Tasks: Science notebook entries Observations Investigation 8-9 I-Check	Notes:
Topic 10: Climate over Time	Length: 4 sessions
Standard(s): MS.ESS3.2 MS.ESS3.5	Academic Vocabulary: carbon dioxide, carbon sequestration, climate change, emission, global warming, greenhouse effect, greenhouse gas, ice core, infrared, paleoclimatology, pollutant
Essential Questions: How have climates changed over time? How do greenhouse gases in the atmosphere affect Earth's temperature? What are the effects of a slight rise in global temperatures? What is the difference between weather and climate?	Learning Targets: Students will understand that weather is the condition of the atmosphere at a specific time and location; climate is the average weather in a region over a long period of time. Students will identify that climate can change over time because of natural Earth cycles or human-induced changes. Students will recognize that when greenhouse-gas concentrations in the atmosphere increase, the global temperature rises. Students will verify that human activity can affect Earth's weather and climate.
Lesson Frame: Climate Change	I can explain how climate has changed over time.
Lesson Frame: The Role of Carbon Dioxide	I can identify the relationship between greenhouse gases and the increase of global temperatures.
Lesson Frame: Climate in the News	I can recognize how human activity affects Earth's weather and climate.
Lesson Frame: Identify Key Ideas	I can describe the differences between weather and climate.
Performance Tasks: Science notebook entries Observations Posttest	Notes:

Unit Name: Diversity of Life	Length: 60 sessions
Standards: MS.LS1.1 MS.LS1.2 MS.LS1.3 MS.LS1.4 MS.LS1.5 MS.LS1.6 MS.LS1.7 MS.LS3.2	Outcomes: All living things are made of cells. All organisms exhibit common characteristics and have certain requirements. Plants reproduce in a variety of ways. Genes are responsible for an organism's traits. Asexual reproduction results in offspring with identical genetic information. Sexual reproduction results in offspring with genetic variation, similar to parents but not identical. Organisms have structures and behaviors that enhance their chances of surviving and reproducing in their environment. Biodiversity is the wide range of existing life-forms that have adapted to the variety of conditions on Earth.
Topic 1: What is Life?	Length: 6 sessions
Standard(s): MS.LS1.1 MS.LS1.3	Academic Vocabulary: evidence, habitat, living, non living, organism, dead, dormant
Essential Questions: How do you know if something is living?	Learning Targets: Students will learn that any free-living thing is an organism. Students will recognize that all organisms exhibit common characteristics and have certain requirements. Students will understand that something can be dead only if it was once living. Students will learn that some organisms can become dormant to survive in an unsuitable environment.
Lesson Frame: Living or Nonliving	I can identify if something is living or nonliving.
Lesson Frame: Is Anything Alive in Here?	I can identify the common characteristics and requirements for all organisms.
Performance Tasks: Science notebook entries Observations	Notes:
Topic 2: The Microscope	Length: 6 sessions
Standard(s): MS.LS1.1 MS.LS1.2	Academic Vocabulary: compound microscope, field of view, magnification, magnify, power, scale

<p>Essential Questions: How do objects appear when they are viewed through a microscope? How can we estimate the size of an object by looking at it through a microscope? What evidence can we find that brine shrimp are living organisms?</p>	<p>Learning Targets: Students will recognize the components of a compound optical microscope. Students will learn that a microscope's optical power is the product of the magnification of the eyepiece and the objective lens. Students will determine that the field of view is the diameter of the circle of light seen through the microscope which decreases and the power increases. Students will recognize that a microscope may reverse and invert images. Students will recognize the common characteristics of life within a microscopic organism contained on a wet mount slide.</p>
Lesson Frame: Meet the Microscope	I can identify the different parts of a compound optical microscope.
Lesson Frame: Field of View	I can determine the size of the field of view based upon the optical power being used.
Lesson Frame: Microscopic Life	I can recognize that a microscopic organism can exhibit common characteristics of life.
<p>Performance Tasks: Science notebook entries Observations</p>	Notes:
Topic 3: The Cell	Length: 8 sessions
<p>Standard(s): MS.LS1.1 MS.LS1.2 MS.LS3.2</p>	<p>Academic Vocabulary: Asexual reproduction, cell, cell membrane, cell structure, cell wall, chlorophyll, chloroplast, cytoplasm, dormancy, elodea, mitochondrion, multicellular organism, nucleus, organelle, paramecium, protist, single-celled organism</p>
<p>Essential Questions: What microscopic structures make up organisms such as elodea? How are elodea and the paramecium alike, and how are they different? Is there life in the mini habitats? If so, where did it come from? What microscopic structures make up organisms such as humans (you)?</p>	<p>Learning Targets: The cell is the basic unit of life. All living things are made up of one or more cells. Every cell has structures that enable it to carry out life's functions. Both single-celled and multicellular organisms exhibit all the characteristics of life. Some organisms can become dormant to survive in an unsuitable environment. Asexual reproduction is a method of reproduction that results in offspring with identical genetic information.</p>
Lesson Frame: Discovering Cells	I can diagram and define plant cell structures and functions.
Lesson Frame: Paramecia	I can diagram and define protist cell structures and functions. I can explain the concept of asexual reproduction.
Lesson Frame: Microworlds	I can describe how and why some organisms become dormant.
Lesson Frame: Human Cheek Tissue	I can diagram and define animal cell structures and functions.

Performance Tasks: Science notebook entries Observations Investigation 1-3 I-Check	Notes:
Topic 4: Domains	Length: 9 sessions
Standard(s): MS.LS1.1 MS.LS1.2 MS.LS3.2	Academic Vocabulary: Archaea, atom, bacteria, classification, colony, control, culture, decomposer, domain, E. coli, eukaryote, fungus, microorganism, molecule, penicillium, plasmid, prokaryote, spore
Essential Questions: What are the building blocks of cell structures? What evidence is there that bacteria are living organisms? What evidence is there that fungi are living organisms? What are the characteristics of archaea?	Learning Targets: Cells are made of cell structures which are made of molecules, which are made of atoms. Bacteria, fungi, and archaea demonstrate all the characteristics of life. Life is classified into three domains (Archaea, Bacteria, Eukarya), depending upon cellular and molecular characteristics.
Lesson Frame: Comparing Living Things	I can explain that cells are made of molecules which are made of atoms.
Lesson Frame: Bacteria	I can describe how bacteria demonstrates all the characteristics of life.
Lesson Frame: Fungi	I can describe how fungi demonstrates all the characteristics of life.
Lesson Frame: Archaea: The Three Domains	I can identify the three domains of life based upon cellular and molecular characteristics.
Performance Tasks: Science notebook entries Observations Investigation 4 I-Check	Notes:
Topic 5: The Vascular System	Length: 8 sessions
Standard(s): MS.LS1.1 MS.LS1.3 MS.LS1.6 MS.LS1.7	Academic Vocabulary: absorb, climatologist, climatology, differential heating, evidence, heat, latitude, radiant energy, radiation, ray, solar angle, wave

<p>Essential Questions: What happened to the water? How does water travel through a plant? How do plants use water?</p>	<p>Learning Targets: Transpiration is the process by which water is carried through vascular plants from the roots to stomata, ensuring that all the cells have access to water. The vascular system of plants consists of xylem and phloem. Plants use photosynthesis and aerobic cellular respiration to make usable energy from the Sun's energy. Cells are the building blocks of tissues, which are the building blocks of organs, which are the building blocks of organ systems, which are the building blocks of multicellular organisms.</p>
Lesson Frame: What Happened to the Water?	I can explain the process of transpiration.
Lesson Frame: Looking at Plant Structures	I can demonstrate how the vascular system of plants works.
Lesson Frame: Transpiration and Photosynthesis	I can describe how transpiration and photosynthesis are necessary for cell life.
<p>Performance Tasks: Science notebook entries Observations Investigation 5 I-Check</p>	Notes:
Topic 6: Plant Reproduction and Growth	Length: 8 sessions
<p>Standard(s): MS.LS1.4 MS.LS1.5 MS.LS3.2</p>	<p>Academic Vocabulary: adaptation, coevolve, egg, environmental factor, fertilize, flower, genetic factor, germination, pollination, pollination syndrome, pollinator, salinity, salt tolerance, seed, sexual reproduction, sperm</p>
<p>Essential Questions: How do the structural adaptations of seeds help them survive? How do environmental factors affect the germination and early growth of different food crops? What is the role of a flower? What adaptations do flowering plants have to accomplish pollination?</p>	<p>Learning Targets: Environmental and genetic factors affect the germination and growth of plants. Flowering plants reproduce sexually, producing seeds, which contain dormant new plants. Flowering plants have characteristics that attract pollinators to ensure successful pollination and reproduction. Pollinators are attracted to flowers that meet their needs.</p>
Lesson Frame: Lima Bean Dissection	I can explain how flowering plants reproduce.
Lesson Frame: Environmental and Genetic Factors	I can describe how environmental and genetic factors affect plants.
Lesson Frame: Flowering-Plant Reproduction	I can create a diagram of the sequence for flowering plant reproduction.
Lesson Frame: Flowers and Pollinators	I can determine the characteristics of a flowering plant that attracts pollinators.
<p>Performance Tasks: Science notebook entries Observations Investigation 6 I-Check</p>	Notes:

Topic 7: Variation of Traits	Length: 4 sessions
Standard(s): MS.LS3.2	Academic Vocabulary: allele, characteristic, chromosome, cross, DNA, dominant, feature, filial, gene, generation, genotype, heredity, heterozygous, homozygous, inheritance, phenotype, population, punnett square, recessive, trait, variation
Essential Questions: How do traits pass from parents to offspring? how does sexual reproduction produce variation in offspring?	Learning Targets: During reproduction (both sexual and asexual), organisms transfer genetic information to offspring. Genes define an organism's genotype. Genes code for proteins, which determine an organism's phenotype. In sexually reproducing organisms, each parent contributes half the offspring's alleles, so that offspring have genotypes that are similar but not identical to either parent. Variation of traits in a population of plants or animals is established in part as a result of sexual reproduction.
Lesson Frame: Inheriting Traits	I can explain how parents transfer genetic information to their offspring.
Lesson Frame: Modeling Heredity	I can use a Punnett square to predict the ratio of genotypes in future generations of sexually reproducing organism.
Performance Tasks: Science notebook entries Observations Investigation 7 I-Check	Notes:
Topic 8: Insects	Length: 5 sessions
Standard(s): MS.LS1.3 MS.LS1.4	Academic Vocabulary: behavior, function, structure
Essential Questions: How do the structures and behaviors of the Madagascar hissing cockroach enable life's functions? How is the insect transport system like plant and human transport systems and how is it different?	Learning Targets: The structures and behaviors of an organism have functions that enhance the organism's chance to survive and reproduce in its habitat. Cells are the building blocks of tissues, which are the building blocks of organs, which are the building blocks of organ systems, which are the building blocks of multicellular organisms. Insects have open circulatory systems that transport substances to and away from their cells.
Lesson Frame: Structure, Function, and Behavior	I can recognize the structures and behaviors of an organism that enhances its chances to survive and reproduce.
Lesson Frame: Insect Systems	I can compare the insect circulatory system to the plant vascular system and the human cardiovascular system.

Performance Tasks: Science notebook entries Observations	Notes:
Topic 9: Diversity of Life	Length: 6 sessions
Standard(s): MS.LS1.1	Academic Vocabulary: biodiversity, virus
Essential Questions: What is the water cycle? What affects the direction that ocean water flows? How does the ocean affect climate on land?	Learning Targets: Biodiversity is the variety of life that exists in a particular habitat or ecosystem. Measuring biodiversity includes measuring both the variety of organisms and the number of organisms in a habitat or ecosystem. Scientific debate regarding whether viruses are living is ongoing.
Lesson Frame: Bioblitz	I can identify the biodiversity within a habitat or ecosystem.
Lesson Frame: What is Life?	I can use my knowledge of living characteristics to debate whether a virus is a living organism.
Performance Tasks: Science notebook entries Observations Posttest	Notes:

Unit Name: Robotics	Length: 24 sessions
Standards: MS.PS2.2 MS.PS2.3 MS.PS2.5 MS.PS3.2 MS.PS3.5 MS.ESS3.4 MS.ETS1.1 MS.ETS1.2 MS.ETS1.3 MS.ETS1.4	Outcomes: Force is a push or pull. Friction is a force that acts to oppose a force acting to put a mass in motion. Magnets have two poles; like poles repel and opposite poles attract. Magnets are surrounded by an invisible magnetic force field that acts through space and through all nonmagnetic materials. Energy cannot be created or destroyed, only transferred. Energy sources are either renewable or nonrenewable. Coding is used to allow robots to act without manual control. Technological advancements contribute to our society. Technological advancements are increasing at an alarming rate. Force and friction are both factors that affect robot coding.
Topic 1: What is Force?	Length: 3 sessions
Standard(s): MS.PS2.2	Academic Vocabulary: friction, force, kinetic energy
Essential Questions: What makes things move? How does friction affect the force needed to move an object? How do multiple forces affect motion?	Learning Targets: Students will learn that a force is a push or a pull. Students will understand that the metric unit for force is the newton (N). Students will recognize that friction is a force that acts to oppose a force acting to put a mass in motion. Students will learn that net force is the sum of the forces acting on a mass.
Lesson Frame: Push and Pull	I can identify that a force is a push or a pull.
Lesson Frame: Friction	I can demonstrate that friction is a force that acts to oppose a force acting to put a mass in motion.
Lesson Frame: Forces in Action	I can determine the net force of the forces acting upon a mass.
Performance Tasks: Science notebook entries Observations Investigation 1 I-Check	Notes:
Topic 2: The Force of Magnetism	Length: 3 sessions
Standard(s): MS.PS2.2 MS.PS2.3 MS.PS2.5 MS.PS3.2	Academic Vocabulary: attract, magnetic field, magnetic force, magnitude, pole, repel

<p>Essential Questions: What happens when magnets interact? How can we detect a magnetic field? What factors affect the force of attraction between magnets?</p>	<p>Learning Targets: Students will recognize that magnets stick to (attract) objects that contain iron. Students will learn that all magnets have two poles; Like poles of magnets repel each other; opposite poles attract. Students will determine that magnets are surrounded by an invisible magnetic force field, which acts through space and through all nonmagnetic materials. Students will learn that magnetic materials may become magnets when they interact with magnetic fields. Students will recognize that the magnitude of the magnetic force between two interacting magnetic fields decreases as the distance between them increases.</p>
Lesson Frame: Properties of Magnets	I can identify the poles of a magnet and what it will attract.
Lesson Frame: Magnetic Fields	I can demonstrate that a magnetic field surrounds a magnet and acts through nonmagnetic materials.
Lesson Frame: Force over Distance	I can recognize that the magnitude of the magnetic forces between two interacting fields decrease as they get closer together.
<p>Performance Tasks: Science notebook entries Observations</p>	Notes:
Topic 3: Introduction to Robots	Length: 6 sessions
<p>Standard(s): MS.PS2.2 MS.PS2.3 MS.PS2.5 MS.LS3.2 MS.ETS1.1 MS.ETS1.2 MS.ETS1.3 MS.ETS1.4 MS.ESS3.3 MS.ESS3.4</p>	<p>Academic Vocabulary: circuit, code, electrical force, machine, magnetic force, programming, robot</p>
<p>Essential Questions: How does an electric motor work? How do robots work? What is the relationship between magnetic and electrical forces?</p>	<p>Learning Targets: Students will learn that energy transfers through an electric circuit from a source to components. Students will understand that energy cannot be created or destroyed, only transferred. Students will recognize the difference between a machine and a robot. Students will determine whether an energy source is renewable or nonrenewable. Students will recognize how technological advancements are contributing to society.</p>
Lesson Frame: Electric Motors	I can explain how energy transfers through a motor to other components.
Lesson Frame: What is a Robot?	I can identify the difference between a machine and a robot and their benefits.
Lesson Frame: Force and Energy	I can determine if an energy source is renewable or nonrenewable.

Performance Tasks: Science notebook entries Observations Robot Presentation	Notes:
Topic 4: Programming	Length: 12 sessions
Standard(s): MS.PS2.2 MS.PS2.3 MS.PS2.5 MS.LS3.2 MS.ETS1.1 MS.ETS1.2 MS.ETS1.3 MS.ETS1.4 MS.ESS3.3 MS.ESS3.4	Academic Vocabulary: code, commands, eye, force, gyro, infrared, interactive, pressure
Essential Questions: What is coding? How does a blueprint help during construction? How does force and motion affect a turning car? How does friction and weight affect a moving vehicle?	Learning Targets: Students will learn the basic fundamentals of coding. Students will understand the importance of blueprints and how to interpret them. Students will recognize that force and motion affect the distance a vehicle moves. Students will plan and modify a design based upon the force and motion exerted upon the vehicle. Students will plan, build, and modify a robot for the sole intent of a specific purpose.
Lesson Frame: Coding	I can determine what commands to use to create an interactive computer game.
Lesson Frame: Basic Unit	I can construct a basic robot using a blueprint and building instructions.
Lesson Frame: 3 Point Turn	I can use my knowledge of coding and energy to program a robot to execute a 3 point turn.
Lesson Frame: Task Specific Programming	I can determine which coding principles to use to manipulate a basic unit and overcome the friction and other forces applied to complete a specific task.
Performance Tasks: Science notebook entries Observations Mechanical Designs Coding Project Completion Posttest	Notes: