



K-8 SCIENCE SCOPE & SEQUENCE

NYC

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inquiry skills

INQUIRY SKILLS – BASED ON NYS MST STANDARDS 1, 2, 6, and 7 (Kindergarten – Grade 8)

Science process skills should be based on a series of discoveries. Students learn most effectively when they have a central role in the discovery process. The MST Standards 1, 2, 6 and 7 (which are standards that are assessed on the New York State and New York City assessments) reflect a student-centered, problem-solving approach to science. Inquiry and Process Skills should be an integral part of each unit of study. The application of these skills allows students to investigate important issues in the world around them. These process skills should be incorporated into students' instruction as developmentally appropriate.

Classifying – arranging or distributing objects, events, or information representing objects or events in classes according to some method or system

Communicating – giving oral and written explanations or graphic representations of observations

Comparing and contrasting – identifying similarities and differences between or among objects, events, data, systems, etc.

Creating models – displaying information, using multisensory representations

Gathering and organizing data – collecting information about objects and events which illustrate a specific situation

Generalizing – drawing general conclusions from particulars

Identifying variables – recognizing the characteristics of objects or factors in events that are constant or change

Inferring – drawing a conclusion based on prior experiences

Interpreting data – analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data

Making decisions – identifying alternatives and choosing a course of action from among the alternatives after basing the judgment for the selection on justifiable reasons

Manipulating materials – handling or treating materials and equipment safely, skillfully, and effectively

Measuring – making quantitative observations by comparing to a conventional or nonconventional standard

Observing – becoming aware of an object or event by using any of the senses (or extensions of the senses) to identify properties

Predicting – making a forecast of future events or conditions expected to exist

process skills

PROCESS SKILLS – BASED ON NYS MST STANDARD FOUR (Kindergarten – Grade 4)*

Science is an ongoing process. Most often there is a question or problem that initiates an investigation searching for a possible solution or solutions. There is no single prescribed scientific method to govern an investigation. It is important that students practice the skills outlined below. For younger students, the emphasis is on discovery. For older students, the emphasis is on formulating and investigating their own questions.

Note: The use of “e.g.” denotes examples that may be used for in-depth study. The terms “for example” and “such as” denote material that is testable. Items in parentheses denote further definition of the word(s) preceding the item and are testable.

General Skills

- i. Follow safety procedures in the classroom, laboratory, and field.
- ii. Safely and accurately use the following tools:
 - hand lens
 - ruler (metric)
 - balance
 - gram weights
 - spring scale
 - thermometer (C°, F°)
 - measuring cups
 - graduated cylinder
 - timepiece(s)
- iii. Develop an appreciation of and respect for all learning environments (classroom, laboratory, field, etc.).
- iv. Manipulate materials through teacher direction and free discovery.
- v. Use information systems appropriately.
- vi. Select appropriate standard and nonstandard measurement tools for measurement activities.
- vii. Estimate, find, and communicate measurements, using standard and nonstandard units.
- viii. Use and record appropriate units for measured or calculated values.
- ix. Order and sequence objects and/or events.
- x. Classify objects according to an established scheme.
- xi. Generate a scheme for classification.
- xiii. Observe, analyze, and report observations of objects and events.
- xiv. Observe, identify, and communicate patterns.

- xv. Observe, identify, and communicate cause-and-effect relationships.
- xvi. Generate appropriate questions (teacher- and student-based) in response to observations, events, and other experiences.
- xvii. Observe, collect, organize, and appropriately *graph* data, then accurately interpret results.
- xviii. Collect and organize data, choosing the appropriate representation:
 - journal entries
 - *graphs*
 - drawings/pictorial representations
- xix. Make predictions based on prior experiences and/or information.
- xx. Compare and contrast organisms/objects/events in the living and physical environments.
- xxi. Identify and control variables/factors.
- xxii. Plan, design, and implement a short-term and long-term investigation based on a student- or teacher-posed problem.
- xxiii. Communicate procedures and conclusions through oral and written presentations.

* *In grades 5-8 the process skills are content-specific and are integrated into the units of study.*

Major Understandings Focused On Health

The following Major Understandings from the NYS Elementary Science Core Curriculum should be covered in grades K-4:

LE 5.3a Humans need a variety of healthy foods, exercise, and rest in order to grow and maintain good health.

LE 5.3b Good health habits include hand washing and personal cleanliness; avoiding harmful substances (including alcohol, tobacco, illicit drugs); eating a balanced diet; engaging in regular exercise.

kindergarten

UNIT 1 (Previously Unit 2) TREES THROUGH THE SEASONS	UNIT 2 (Previously Unit 1) EXPLORING PROPERTIES	UNIT 3 (Same) ANIMALS
What are some changes we see in trees during the year?	How do we observe and describe objects?	What are animals?
<p>Identify the basic needs of organisms to live and thrive:</p> <ul style="list-style-type: none"> Needs of plants to live and thrive (e.g., air, water, light) Living things grow and change. <p>LE 1.1b LE 1.2a LE 4.2a LE 5.1a</p> <p>Observe and compare the different structures that enable each plant to live and thrive:</p> <ul style="list-style-type: none"> Roots, leaves, stems, flowers, seeds <p>LE 3.1b</p> <p>Observe adaptations of plants:</p> <ul style="list-style-type: none"> Plants respond to changes in the environment including seasonal changes such as: <ul style="list-style-type: none"> –Leaves falling in autumn and forming in springtime –Flowers blooming <p>LE 3.1c LE 5.2a</p>	<p>Observe and describe physical properties of objects using all of the appropriate senses:</p> <ul style="list-style-type: none"> Size, shape, texture, weight, color, etc. Determine whether objects are alike or different <p>PS 3.1b,c</p> <p>Observe and describe physical properties of objects using appropriate tools:</p> <ul style="list-style-type: none"> Hot/cold (thermometer) Weight (pan balance) Measurement (nonstandard units) including bigger/smaller, more/less, capacity of liquids Observations (hand lenses) <p>PS 3.1c,d,e,g</p> <p>Observe, describe, and identify the properties of materials (e.g., wood, plastic, metal).</p> <p>PS 3.1b,c,e</p> <p>Sort or group objects according to their properties:</p> <ul style="list-style-type: none"> Texture, color, shape, etc. Sink and float <p>PS 3.1f</p>	<p>Identify the basic needs of organisms to live and thrive:</p> <ul style="list-style-type: none"> Needs of animals to live and thrive (e.g., air, water, food, shelter) Living things grow and change. <p>LE 1.1a LE 1.2a LE 4.1g LE 4.2a LE 5.1a</p> <p>Observe and compare the different structures that enable each animal to live and thrive:</p> <ul style="list-style-type: none"> Wings, legs, fins, eyes, nose, ears, tongue, skin, claws, etc. <p>LE 3.1a</p> <p>Make clear that nonliving things do not live and thrive.</p> <p>LE 1.1c,d</p> <p>Recognize that living things have offspring and that offspring closely resembles its parents:</p> <ul style="list-style-type: none"> Dogs /puppies, cats/kittens, cows/calves, ducks/ducklings, frogs/tadpoles <p>LE 2.2a</p> <p>Observe physical animal characteristics that are influenced by changing environmental conditions such as:</p> <ul style="list-style-type: none"> Coat thickness in winter, rabbits changing fur color, shedding of fur <p>LE 5.2e</p> <p>Observe that some animal behaviors are influenced by environmental conditions:</p> <ul style="list-style-type: none"> Nest building, hibernation, migration <p>LE 5.2f</p>

The right hand column in each unit represents the Major Understandings taken from the New York State Elementary Science Core Curriculum, available at <http://www.emsc.nysed.gov/ciai/mst/pub/elecoresci.pdf>. PS = Physical Setting, Standard 4. Science process skills should be based on a series of discoveries. Students learn most effectively when they have a central role in the discovery process. To that end, MST Standards 1, 2, 6 and 7 incorporate in the science core curriculum a student-centered, problem-solving approach to science. Inquiry and Process Skills should be an integral part of each unit of study. For Major Understandings in science related to health, please see page ii.

grade 1

UNIT 1 (Previously Unit 3) ANIMAL DIVERSITY		UNIT 2 (Previously Unit 1) PROPERTIES OF MATTER		UNIT 3 (Previously Unit 2) WEATHER AND SEASONS	
<i>How are animals alike and different?</i>		<i>What are some properties of solids, liquids, and gases?</i>		<i>What are some of the changes we notice between seasons?</i>	
Identify, describe, and compare the physical structures of animals (e.g., body coverings, sensory organs, appendages, beaks).	LE 3.1a	Observe and describe the three states of matter: <ul style="list-style-type: none"> Liquids take the shape of the containers they are in. Air does not have a definite shape. Solids have a definite shape. 	PS 3.2a	Observe and describe weather conditions that occur during each season.	PS 1.1a
Identify, in animals, the relationship between the physical structures and the functions of those structures (e.g., obtaining food and water, protection, movement, support).	LE 1.1a LE 3.1a	Observe and describe how water evaporates when left in an open container (liquid water changes into gas as it moves into the air). Observe that the material(s) of which an object is made determines some specific properties of the object (sinking/floatation, solubility).	PS 2.1c PS 3.2c PS 3.1e	Observe, measure, record, and compare weather data throughout the year (e.g., cloud cover, cloud types, wind speed and direction, precipitation) by using thermometers, anemometers, wind vanes, and rain gauges.	PS 2.1a,b
Compare and contrast the physical characteristics in animals.	LE 3.1a	Predict, observe, and examine different substances to determine their ability to mix with water (e.g., oil, water; sugar, water; sand, water).	PS 3.1f PS 3.2c	Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade). Compare day and night temperatures.	PS 1.1a PS 3.1g
Describe how physical traits help a species to survive (e.g., giraffe's neck, turtle's shell).	LE 3.1a LE 3.1c	Use tools such as hand lenses, rulers, thermometers, and balances to observe and measure the properties of materials.	PS 3.1e	Illustrate and describe how the sun appears to move during the day.	PS 1.1a
Observe how animals grow and change in predictable ways: <ul style="list-style-type: none"> Animals closely resemble their parents and other individuals in their species. Some traits of living things have been inherited (e.g., number of limbs). 	LE 2.2a LE 2.1a LE 2.2b	Test objects to determine whether they sink or float: <ul style="list-style-type: none"> Different materials (plastic, rubber, etc.) Different shapes Boat design 	PS 3.1e,f	Illustrate and describe how the moon changes appearance over time (phases of the moon).	
Describe animal life cycles and life spans (e.g., baby/adult, puppy to dog).	LE 4.1a,e,f,g	Observe, and describe the change of objects when placed in different environments. <ul style="list-style-type: none"> Hot and cold Lighting and shadows Color Wet and dry 	PS 3.1c,d,e,g	Describe the 24 hour day/night cycle(time). Observe and record the changes in the sun's and other stars' position, and the moon's appearance relative to time of day and month, and note the pattern of this change.	PS 1.1b PS 1.1c
				Recognize that the sun's energy warms the air.	PS 4.2a

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grade 2

UNIT 1 (Previously Unit 2) EARTH MATERIALS	UNIT 2 (Previously Unit 1) FORCES AND MOTION	UNIT 3 (Same) PLANT DIVERSITY
<i>What materials make up the Earth?</i>	<i>What causes objects to move?</i>	<i>How are plants alike and different?</i>
Observe and describe the basic properties and components of soil: <ul style="list-style-type: none"> • Living components • Nonliving components 	Observe and describe the position of an object relative to another object (over, under, on top of, next to).	Identify and compare the physical structures of a variety of plant parts (seeds, leaves, stems, flowers, roots).
Investigate different types of soil according to: <ul style="list-style-type: none"> • Color • Texture • Materials • Capacity to retain water 	Identify a force as push or a pull	Observe and describe how plants grow and change in predictable ways: <ul style="list-style-type: none"> • Plants closely resemble their parents and other individuals of their species • Some traits of living things have been inherited (e.g., color of flower)
Explore how erosion and deposition are the result of interactions between air, wind, water, and land.	Demonstrate how the position or direction of an object can be changed by pushing or pulling (forces and motion): <ul style="list-style-type: none"> • Change the direction of objects by pushing and pulling using blocks, ramps, cars, and balls. <ul style="list-style-type: none"> – Inclined plane 	Observe plant life cycles and life spans.
Observe and describe the physical properties of rocks (size, shape, color, presence of fossils).	Identify gravity as a force that pulls objects down: <ul style="list-style-type: none"> • The balance scale • Balance and the center of gravity 	Observe that plants reproduce from: <ul style="list-style-type: none"> • Seeds, bulbs and cuttings
Compare and sort rocks by size, color, luster, texture, patterns, hardness/softness.	Identify gravity as a force that pulls objects down:	Describe the basic needs of plants: <ul style="list-style-type: none"> • Light, air, water, soil (nutrients)
Make clear that nonliving things can be human-created or naturally occurring.	Observe and describe how the force of gravity can affect objects through air, liquids, and solids.	Describe the basic life functions of plants: <ul style="list-style-type: none"> • Grow • Take in nutrients • Reproduce Observe that plants respond to changes in their environment (e.g., the leaves of some green plants change position as the direction of light changes; the parts of some plants undergo seasonal changes that enable the plant to grow, seeds to germinate, and leaves to form and grow).

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grade 3

UNIT 1 MATTER	UNIT 2 ENERGY	UNIT 3 SIMPLE MACHINES	UNIT 4 PLANT AND ANIMAL ADAPTATIONS
<i>What are some of the properties of matter?</i>	<i>What are some ways that energy can be changed from one form to another?</i>	<i>How do simple machines help us move objects?</i>	<i>How are plants and animals well-suited to live in their environments?</i>
<p>Measure, compare and record physical properties of objects using:</p> <ul style="list-style-type: none"> Standard (metric) and nonstandard units Appropriate tools (e.g., rulers, thermometers, pan balances, spring scales, graduated cylinders, beakers) <p>Describe and compare the physical properties of matter (size, shape, mass/weight, volume, flexibility, luster, color, texture, hardness, odor, etc.).</p>	<p>Observe, identify, and describe a variety of forms of energy:</p> <ul style="list-style-type: none"> Sound Heat Chemical Mechanical Electricity <p>Identify the evidence for energy transformations and how humans use these energy transformations:</p> <ul style="list-style-type: none"> Heat to light, chemical to electrical, electrical to sound, etc. <p>Observe and describe how heat is conducted and can be transferred from one place to another.</p> <p>Observe and describe different ways in which heat can be released:</p> <ul style="list-style-type: none"> Burning, rubbing (friction), or combining one substance with another. <p>Interactions of matter and energy (e.g., electricity lighting a bulb, dark colors absorbing light, etc.).</p> <p>Sound energy:</p> <ul style="list-style-type: none"> Pitch (frequency) Vibrations Volume How sound travels through solids, liquids, gases Noise pollution 	<p>Demonstrate how mechanical energy may cause change in motion through the application of force or the use of simple machines such as:</p> <ul style="list-style-type: none"> Levers, pulleys, inclined planes Wheel and axle <p>Observe and describe how the amount of change in the motion of an object is affected by friction</p> <p>Observe and describe how the position or direction of motion of an object can be changed by pushing or pulling.</p> <p>Observe how the force of gravity pulls objects toward the center of the Earth.</p>	<p>Describe how all living things grow, take in nutrients, breathe, reproduce and eliminate waste.</p> <p>Describe how plants must be adapted to their environment in order to survive.:</p> <ul style="list-style-type: none"> Structures and their functions (e.g., roots, leaves, flowers, etc.) Adaptations of these structures may include variations in size, shape, thickness, color, smell, and texture. Plants change as the seasons change Seed dispersal <p>Describe how animals must be adapted to their environment in order to survive:</p> <ul style="list-style-type: none"> Structures and their functions (e.g., wings, legs, fins, scales, feathers, fur, etc.) Understand that animals respond to change in the environment (e.g., heart rate, eye blinking, shivering) Animals change as seasons change <ul style="list-style-type: none"> Hibernation Migration (i.e., moving from place to place to meet needs) including human <p>Recognize that traits of living things are both:</p> <ul style="list-style-type: none"> Inherited (color of flowers, eye color). Learned/acquired (riding a bicycle, having scars)

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grade 4

UNIT 1 ANIMALS AND PLANTS IN THEIR ENVIRONMENT	UNIT 2 ELECTRICITY AND MAGNETISM	UNIT 3 PROPERTIES OF WATER	UNIT 4 INTERACTIONS OF AIR, WATER, AND LAND
<i>What roles do plants and animals play in their environments?</i>	<i>What are the properties of electricity and magnetism?</i>	<i>What makes water so special?</i>	<i>How do natural events affect our world?</i>
<p>Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web). LE 6.1a-d</p> <p>Explore how plants manufacture food by utilizing air, water, and energy from the sun. LE 6.2a,b</p> <p>Understand that food supplies energy and materials necessary for growth and repair. LE 4.2b</p> <p>Identify populations within a community that are in competition with one another for resources. LE 6.1e</p> <p>Recognize that individual variations within a species may cause certain individuals to have an advantage in surviving and reproducing. LE 3.2a,b</p> <p>Describe how the health, growth, and development of organisms are affected by environmental conditions such as availability of food, water, air, space, shelter, heat, and sunlight. LE 5.2g</p> <p>Understand that their senses help animals survive. LE 5.2c</p> <p>Observe that when the environment changes, some plants and animals survive and reproduce, while others die or move to new locations. LE 6.1f</p> <p>Describe the way that humans: • Depend on their natural and constructed environment. • Have changed their environment over time. LE 7.1a,b</p> <p>Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation). LE 7.1b,c</p>	<p>Observe, describe, and investigate the evidence of energy transfer in electrical circuits: • Simple circuits • Open and closed circuits • Switches PS 4.1a,b PS 4.1c,d,e</p> <p>Construct and diagram an electrical circuit. PS 4.1e</p> <p>Identify conductors and insulators in an electrical circuit. PS 4.1c</p> <p>Compare the electrical and magnetic properties of different materials. PS 3.1c,e,f</p> <p>Investigate properties of magnets, including: • Magnets attract or repel certain objects • Magnets attract or repel each other • Magnetic forces can operate on objects across distances and through materials • A magnetic field is produced PS5.1e PS5.2a,b</p> <p>Explore the interaction of electricity and magnetism to create an electromagnet. PS 4.1d</p> <p>Describe how electricity can be helpful or harmful to people (safety). PS 4.1g</p>	<p>Observe, describe, and explore the physical properties of water: • Color, texture, odor, sound • Changes in shape • Changes in the amount of space occupied (compare using containers of different shapes and sizes). • Volume, mass (weight) PS 3.1a,b PS 3.1c,d,e</p> <p>Explore how different factors affect evaporation. PS 2.1c PS 3.2a,b,c LE 6.2c</p> <p>Describe the Water Cycle. PS 2.1c LE 6.2c</p> <p>Test objects to determine whether they sink or float: • Different materials (plastic, rubber etc.) • Different shapes • Boat design PS 3.1e,f</p> <p>Predict, observe, and examine different substances to determine their ability to mix with water (e.g., oil, water; sugar, water; wooden block, water). PS 3.1e,f PS 3.2c</p> <p>Examine and describe the transformation of matter from one state to another, e.g., solid water (ice) to liquid (water) to gas (water vapor). PS 3.2 a,b</p> <p>Water is recycled by natural processes on earth. • Precipitation • Condensation • Evaporation PS 3.2 a,b</p> <p>Predict and investigate the effect of heat energy on objects and materials. (e.g., change in temperature, melting, evaporation) PS 2.1c PS 3.2b,c PS 4.1d</p> <p>Describe the physical changes of materials. PS 3.2c</p>	<p>Observe, investigate, and record examples of physical and chemical weathering. PS 2.1 d</p> <p>Describe how erosional processes (e.g., action of gravity, wind, and water) cause surface changes to the land. PS 2.1d</p> <p>Investigate, measure, and observe the deposition of earth materials. PS 2.1d</p> <p>Describe and illustrate the natural processes by which water is recycled on earth (e.g., ground water, runoff). PS 2.1c</p> <p>Investigate the negative and positive impact of extreme natural events on living things: • Earthquakes • Volcanoes • Hurricanes • Tornadoes • Floods • Fires PS 2.1 e</p>

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grade 5

UNIT 1 THE NATURE OF SCIENCE	UNIT 2 EARTH SCIENCE	UNIT 3 FOOD AND NUTRITION	UNIT 4 EXPLORING ECOSYSTEMS
<p><i>How do scientists gather and share information?</i></p> <p><u>Intermediate Level Major Understandings</u></p>	<p><i>What are the processes that help shape the land?</i></p> <p><u>Intermediate Level Major Understandings</u></p>	<p><i>How does nutrition and exercise affect our health?</i></p> <p><u>Elementary Level Major Understandings</u></p>	<p><i>How are plants and animals in an ecosystem connected?</i></p> <p><u>Intermediate Level Major Understandings</u></p>
<p>Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations. S1.1a,b,c</p> <p>Identify questions and formulate hypothesis; design and conduct scientific investigations to answer those questions. S1.2a, S2.1b,c, S2.2b,c,d,e, S2.3b,c</p> <p>Employ tools to gather, analyze, and interpret data. S2.1d, S3.1a,b</p> <p>Use mathematics in scientific inquiry. M3.1a</p> <p>Use data to construct reasonable explanations. <u>Evaluate your hypothesis in light of the data.</u> S3.2a,b,c</p> <p>Develop and communicate explanations using evidence. S1.3, S3.2d,e</p> <p>Identify dependent and independent variables. M1.1a, S2.2d</p>	<p>Differentiate between rocks and minerals. PS 2.1e</p> <p>Classify rocks as sedimentary, igneous, or metamorphic. PS 2.2g</p> <p>Investigate, record, and explain how rocks and soil form. PS 2.1g,h, PS 2.2g,h</p> <p>Observe, compare, and describe <u>the topography of the earth's surface.</u> PS 2.2a,f</p> <p>Investigate, record, and explain the variables that affect erosion and deposition. PS 2.1g,i</p> <p>Investigate and explain how weathering leads to the formation of sediment. PS 2.1h</p> <p>Identify events (earthquakes, volcanic eruptions, etc.) that cause earth movements. PS 2.2a,c,f</p> <p>Develop and construct models of landforms. S1.2b</p>	<p>Recognize that:</p> <ul style="list-style-type: none"> Humans need a variety of healthy foods, exercise, and rest in order to grow and maintain good health. <i>(omitted LE 5.2a,b, e,f)</i> LE 5.3a Good health habits include hand washing and personal cleanliness; avoiding harmful substances (including alcohol, tobacco, illicit drugs); eating a balanced diet; engaging in regular exercise. <i>(omitted LE 5.2e,f)</i> LE 5.3b The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, shelter, heat, and sunlight. <i>(omitted LE 5.2e,f)</i> LE 5.2g Food supplies the energy and materials necessary for growth and repair. <i>(omitted PS 3.1c,d, e,g)</i> LE 4.2b 	<p>Observe, identify, and record the components of a forest ecosystem. LE 7.1a</p> <p>Observe and describe how plants use air, water, and energy from the sun to produce their own food. LE 5.1d, LE 6.2a</p> <p>Describe how food supplies the energy and materials necessary for growth and repair of living organisms. LE 5.1c, LE 5.2a</p> <p>Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web). LE 5.1d,e, LE 6.1 a,b</p> <p>Identify populations within a community that are in competition with one another for resources. LE 3.2a <i>(omitted LE 7.1b)</i></p> <p>Describe the way humans: <i>(omitted LE 7.1a,b)</i></p> <ul style="list-style-type: none"> Depend on their natural and constructed environment. LE 7.2b,c Have changed their environment over time. LE 7.2d <p>Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation). LE 7.2b,c, LE 7.2d</p>

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UNIT 1 THE NATURE OF SCIENCE	UNIT 2 EARTH SCIENCE	UNIT 3 FOOD AND NUTRITION	UNIT 4 EXPLORING ECOSYSTEMS
<p><i>How do scientists gather and share information?</i> Intermediate Level Major Understandings</p>	<p><i>What are the processes that help shape the land?</i> Intermediate Level Major Understandings</p>	<p><i>How does nutrition and exercise affect our health?</i> Elementary Level Major Understandings</p>	<p><i>How are plants and animals in an ecosystem connected?</i> Intermediate Level Major Understandings</p>
<p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> - metric ruler - balance - stopwatch - graduated cylinder - thermometer – Use appropriate units for measured or calculated values. – Recognize and analyze patterns and trends. – Sequence events. – Identify cause-and-effect relationships. 	<p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> - metric ruler - balance - graduated cylinder – Use appropriate units for measured or calculated values. – Recognize and analyze patterns and trends. – Classify objects according to an established scheme and a student-generated scheme. – Sequence events. – Identify cause-and-effect relationships. <p style="text-align: right;">(continued)</p>	<p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> - metric ruler - balance - stopwatch - graduated cylinder - thermometer – Use appropriate units for measured or calculated values. – Classify objects according to an established scheme. – <u>Order and sequence objects and/or events.</u> – Identify cause-and-effect relationships. <p style="text-align: right;">(continued)</p>	<p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> - metric ruler - balance - graduated cylinder - thermometer – Use appropriate units for measured or calculated values. – Recognize and analyze patterns and trends. – Classify objects according to an established scheme and a student-generated scheme. – Identify cause-and-effect relationships. – Use indicators and interpret results. <p style="text-align: right;">(continued)</p>

The right hand column in each unit represents the Major Understandings taken from the New York State Intermediate Level Science Core Curriculum (those in Unit 3 are taken from the New York State Elementary Level Science Core Curriculum), available at www.emsc.nysed.gov/ciai/mst/pub/intersci.pdf. PS = Physical Setting – Standard 4, LE = Living Environment – Standard 4. Science process skills should be based on a series of discoveries. Students learn most effectively when they have a central role in the discovery process. To that end, MST Standards 1, 2, 6 and 7 incorporate in the science core curriculum a student-centered, problem-solving approach to science. Inquiry and Process Skills should be an integral part of each unit of study. For Major Understandings in science related to health, please see page ii.

grade 5 CONTINUED

UNIT 1 THE NATURE OF SCIENCE	UNIT 2 EARTH SCIENCE	UNIT 3 FOOD AND NUTRITION	UNIT 4 EXPLORING ECOSYSTEMS
<p><i>How do scientists gather and share information?</i> <u>Intermediate Level Major Understandings</u></p>	<p><i>What are the processes that help shape the land?</i> <u>Intermediate Level Major Understandings</u></p>	<p><i>How does nutrition and exercise affect our health?</i> <u>Elementary Level Major Understandings</u></p>	<p><i>How are plants and animals in an ecosystem connected?</i> <u>Intermediate Level Major Understandings</u></p>
	<p>Physical Setting Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Using identification tests and a flow chart, identify mineral samples. – Use a diagram of the rock cycle to determine geological processes that led to the formation of a specific rock type. 	<p><i>[Deleted: Living Environment Skills (from NYS <u>Elementary</u> Core Curriculum)]</i></p>	<p>Living Environment Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Classify living things according to a student-generated scheme and an established scheme. – Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.

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TRANSFORMATION OF ENERGY; SYSTEMS

grade 6

UNIT 1 SIMPLE AND COMPLEX MACHINES	UNIT 2 WEATHER	UNIT 3 DIVERSITY OF LIFE	UNIT 4 INTERDEPENDENCE
How does energy play a role in our lives? How do machines impact our lives?	How do matter and energy interact to produce weather patterns?	How does the transfer of matter and energy through biological communities support diversity of living things?	How is interdependence essential in maintaining life on Earth?
<ul style="list-style-type: none"> Potential and kinetic energy PS 4.1e Mechanical energy PS 4.1d PS 5.2c Machines can affect the magnitude or direction of a force required to do work, or the distance over which that force is applied. PS 5.2f Simple machines include the lever, the pulley, the wheel and axle, and the inclined plane. PS 5.2g Complex machines PS 5.2g Transformation of energy within simple and complex machines PS 4.1c PS 5.2c Principle of the conservation of energy PS 4.5a,b PS 5.2c Friction and machines PS 5.2d,e 	<p>Properties of Matter</p> <ul style="list-style-type: none"> Matter is anything that takes up space and has mass. PS 3.1a Solids, liquids, and gases PS 3.1a,c,f PS 4.2c Relationship between phases of matter and particle motion PS 3.1c,f PS 4.2c,d Density PS 3.1a,h <p>Heating and Cooling Events</p> <ul style="list-style-type: none"> Principle of the conservation of energy PS 4.5a,b Transfer of heat: radiation, convection, and conduction PS 4.1a PS 4.2a,b Heat and its relationship to phase changes PS 3.1c PS 3.2a PS 4.2c,d Expansion and contraction PS 4.2d 	<p>Kingdoms of Life</p> <ul style="list-style-type: none"> What makes something “alive”? LE 1.1a The cell is a basic unit of structure and function of living things. LE 1.1a-c Unicellular vs. multicellular organisms LE 1.1d-g Biological classification systems LE 1.1h <p>Food Chains and Food Webs</p> <p>deleted • Principle of the conservation of energy deleted PS 4.1d PS 4.5a,b</p> <ul style="list-style-type: none"> Flow of energy and matter through food chains and food webs LE 5.1c LE 5.2a LE 6.1a-c Methods for obtaining nutrients LE 5.1d,e deleted LE 5.2b Role of producers LE 6.2a-c 	<p>Climate and Biomes</p> <ul style="list-style-type: none"> Climatic regions PS 2.2j Biomes: Tundra, Tropical Rain Forest, Temperate Forests, Grasslands, Desert LE 7.1a ICT 1.2, 1.4,4.1 Seasonal variations PS 1.1i Effect of elevation PS 2.1b Global Warming: natural cycles vs. human impact LE 7.2d PS 2.2r ICT 1.4, 2.1-2.3, 4.1, 5.1, 5.2, 6.1, 6.2, IPS 1.3 <p>Ecosystems and Interdependence</p> <ul style="list-style-type: none"> Populations and definition of species LE 1.1h LE 7.1a Communities LE 7.1a Ecosystems (including basic abiotic factors such as water, nitrogen, CO₂, and oxygen) LE 7.1a LE 7.2a,b ICT 1.2

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PS = Physical Setting – Standard 4, LE = Living Environment – Standard 4, ICT = Interconnectedness: Common Themes – Standard 6 and IPS = Interdisciplinary Problem Solving – Standard 7. Science process skills from Standards 1, 2, 6 and 7 should be used in conjunction with this scope and sequence.

TRANSFORMATION OF ENERGY; SYSTEMS

grade 6

UNIT 1 SIMPLE AND COMPLEX MACHINES	UNIT 2 WEATHER	UNIT 3 DIVERSITY OF LIFE	UNIT 4 INTERDEPENDENCE
<p><i>How does energy play a role in our lives? How do machines impact our lives?</i></p>	<p><i>How do matter and energy interact to produce weather patterns?</i></p>	<p><i>How does the transfer of matter and energy through biological communities support diversity of living things?</i></p>	<p><i>How is interdependence essential in maintaining life on Earth?</i></p>
<p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> - metric ruler - spring scale. – Use appropriate units for measured or calculated values. – Recognize and analyze patterns and trends. – Sequence events. – Identify cause-and-effect relationships. 	<p>Weather</p> <ul style="list-style-type: none"> • Weather is the result of complex interactions of the atmosphere, hydrosphere, and lithosphere; all weather is caused by the unequal heating of the earth’s surface. PS 2.1a,c,d,j PS 2.2i,k,r • Light energy vs. heat energy PS 4.1a,c,d PS 4.4a,b • Hydrosphere/atmosphere interactions: Water cycle, Precipitation PS 2.1j • Weather factors: Pressure, relative humidity, temperature, wind PS 2.2i • Air masses and fronts PS 2.2l-p • Extreme weather events: hurricanes, tornadoes, blizzards, drought PS 2.2q <p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. 	<ul style="list-style-type: none"> • Role(s) of consumers: idea of respiration/ recycling; herbivores/ carnivores/omnivores. LE 5.1d,e LE 5.2b,c-e • The role of decomposers. LE 5.1e <p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Recognize and analyze patterns and trends. – Develop and use a dichotomous key. – Sequence events. – Identify cause-and-effect relationships. <p>Living Environment Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Manipulate a compound microscope to view microscopic objects. – Determine the size of a microscopic object using a compound microscope. 	<ul style="list-style-type: none"> • Factors affecting the population growth of organisms — Predator/ prey relationships LE 7.1b • Relationships among organisms: beneficial and harmful LE 3.2a LE 7.1c,d LE 7.2c • Effects of environmental changes on humans and other populations LE 7.2a-d LE 7.1e ICT 5.2 <p>Adaptations for Survival</p> <ul style="list-style-type: none"> • Thermoregulation in plants and animals LE 1.2e LE 5.1a,b,f deleted 5.1g • Locomotion add LE 5.1g <p>General Skills (from NYS Core Curriculum)</p> <ul style="list-style-type: none"> – Follow safety procedures in the classroom and laboratory. – Safely and accurately use the following measurement tool: <ul style="list-style-type: none"> - thermometer. – Use appropriate units for measured or calculated values.

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