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# NYC K-8 SCIENCE SCOPE & SEQUENCE



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# *inquiry skills*

## **INQUIRY SKILLS – BASED ON NYS MST STANDARD ONE (Kindergarten – Grade 8)**

It should be a goal of the instructor to foster the development of science process skills. The application of these skills allows students to investigate important issues in the world around them. Inquiry-based units will include many or most of the following process skills. 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 record data, then accurately interpret results.
- xviii. Collect and organize data, choosing the appropriate representation:
  - journal entries
  - graphic representations
  - 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 EXPLORING PROPERTIES	UNIT 2 TREES THROUGH THE SEASONS	UNIT 3 ANIMALS
<b>How do we observe and describe objects?</b>	<b>What are some changes we see in trees during the year?</b>	<b>What are animals?</b>
<p>Observe and describe physical properties of objects using all of the appropriate senses:</p> <ul style="list-style-type: none"> <li>• Size, shape, texture, weight, color, etc.</li> <li>• Determine whether objects are alike or different</li> </ul> <p>PS 3.1b,c</p> <p>Observe and describe physical properties of objects using appropriate tools:</p> <ul style="list-style-type: none"> <li>• Hot/cold (thermometer)</li> <li>• Weight (pan balance)</li> <li>• Measurement (nonstandard units) including bigger/smaller, more/less, capacity of liquids</li> <li>• Observations (hand lenses)</li> </ul> <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"> <li>• Texture, color, shape, etc.</li> <li>• Sink and float</li> </ul> <p>PS 3.1f</p>	<p>Identify the basic needs of organisms to live and thrive:</p> <ul style="list-style-type: none"> <li>• Needs of plants to live and thrive (e.g., air, water, light)</li> <li>• Living things grow and change.</li> </ul> <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"> <li>• Roots, leaves, stems, flowers, seeds</li> </ul> <p>LE 3.1b</p> <p>Observe adaptations of plants:</p> <ul style="list-style-type: none"> <li>• Plants respond to changes in the environment including seasonal changes such as: <ul style="list-style-type: none"> <li>– Leaves falling in autumn and forming in springtime</li> <li>– Flowers blooming</li> </ul> </li> </ul> <p>LE 3.1c LE 5.2a</p>	<p>Identify the basic needs of organisms to live and thrive:</p> <ul style="list-style-type: none"> <li>• Needs of animals to live and thrive (e.g., air, water, food, shelter)</li> <li>• Living things grow and change.</li> </ul> <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"> <li>• Wings, legs, fins, eyes, nose, ears, tongue, skin, claws, etc.</li> </ul> <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"> <li>• Dogs /puppies, cats/kittens, cows/calves, ducks/ducklings, frogs/tadpoles</li> </ul> <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"> <li>• Coat thickness in winter, rabbits changing fur color, shedding of fur</li> </ul> <p>LE 5.2e</p> <p>Observe that some animal behaviors are influenced by environmental conditions:</p> <ul style="list-style-type: none"> <li>• Nest building, hibernation, migration</li> </ul> <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. LE = Living Environment, Standard 4. Inquiry and Process Skills should be an integral part of each unit of study; see pages i to ii. For Major Understandings in Science related to health, please see page ii.

# grade 1

UNIT 1 PROPERTIES OF MATTER	UNIT 2 WEATHER AND SEASONS	UNIT 3 ANIMAL DIVERSITY
<p><b>What are some properties of solids, liquids, and gases?</b></p>	<p><b>What are some of the changes we notice between seasons?</b></p>	<p><b>How are animals alike and different?</b></p>
<p>Observe and describe the three states of matter: PS 3.2a</p> <ul style="list-style-type: none"> <li>Liquids take the shape of the containers they are in.</li> <li>Air does not have a definite shape.</li> <li>Solids have a definite shape.</li> </ul> <p>Observe and describe how water evaporates when left in an open container (liquid water changes into gas as it moves into the air). PS 2.1c PS 3.2c</p> <p>Observe that the material(s) of which an object is made determines some specific properties of the object (sinking/floatation, solubility). PS 3.1e</p> <p>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</p> <p>Use tools such as hand lenses, rulers, thermometers, and balances to observe and measure the properties of materials. PS 3.1e</p> <p>Test objects to determine whether they sink or float: PS 3.1e,f</p> <ul style="list-style-type: none"> <li>Different materials (plastic, rubber, etc.)</li> <li>Different shapes</li> <li>Boat design</li> </ul> <p>Observe, and describe the change of objects when placed in different environments. PS 3.1c,d,e,g</p> <ul style="list-style-type: none"> <li>Hot and cold</li> <li>Lighting and shadows</li> <li>Color</li> <li>Wet and dry</li> </ul>	<p>Observe and describe weather conditions that occur during each season. PS 1.1a</p> <p>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</p> <p>Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade). PS 1.1a PS 3.1g</p> <p>Compare day and night temperatures.</p> <p>Illustrate and describe how the sun appears to move during the day. PS 1.1a</p> <p>Illustrate and describe how the moon changes appearance over time (phases of the moon).</p> <p>Describe the 24 hour day/night cycle(time). PS 1.1b</p> <p>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 1.1c</p> <p>Recognize that the sun’s energy warms the air. PS 4.2a</p>	<p>Identify, describe, and compare the physical structures of animals (e.g., body coverings, sensory organs, appendages, beaks). LE 3.1a</p> <p>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</p> <p>Compare and contrast the physical characteristics in animals. LE3.1a</p> <p>Describe how physical traits help a species to survive (e.g., giraffe’s neck, turtle’s shell). LE 3.1c</p> <p>Observe how animals grow and change in predictable ways: LE 2.2a LE 2.1a LE 2.2b</p> <ul style="list-style-type: none"> <li>Animals closely resemble their parents and other individuals in their species.</li> <li>Some traits of living things have been inherited (e.g., number of limbs).</li> </ul> <p>Describe animal life cycles and life spans (e.g., baby/adult, puppy to dog). LE 4.1a,e,f,g</p>

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# grade 2

UNIT 1 FORCES AND MOTION	UNIT 2 EARTH MATERIALS	UNIT 3 PLANT DIVERSITY
<i>What causes objects to move?</i>	<i>What materials make up the Earth?</i>	<i>How are plants alike and different?</i>
<p>Observe and describe the position of an object relative to another object (over, under, on top of, next to). PS 5.1a</p>	<p>Observe and describe the basic properties and components of soil: PS 2.1d</p> <ul style="list-style-type: none"> <li>• Living components</li> <li>• Nonliving components</li> </ul>	<p>Identify and compare the physical structures of a variety of plant parts (seeds, leaves, stems, flowers, roots). LE 3.1b</p>
<p>Identify a force as push or a pull PS 5.1</p>	<p>Investigate different types of soil according to: PS 2.1d PS 3.1b,c,d PS 3.1e,f,g</p> <ul style="list-style-type: none"> <li>• Color</li> <li>• Texture</li> <li>• Materials</li> <li>• Capacity to retain water</li> </ul>	<p>Observe and describe how plants grow and change in predictable ways: LE 2.1a LE 2.2 a,b</p> <ul style="list-style-type: none"> <li>• Plants closely resemble their parents and other individuals of their species</li> <li>• Some traits of living things have been inherited (e.g., color of flower)</li> </ul>
<p>Demonstrate how the position or direction of an object can be changed by pushing or pulling (forces and motion): PS 5.1b PS 5.1c</p> <ul style="list-style-type: none"> <li>• Change the direction of objects by pushing and pulling using blocks, ramps, cars, and balls.               <ul style="list-style-type: none"> <li>– Inclined plane</li> </ul> </li> </ul>	<p>Explore how erosion and deposition are the result of interactions between air, wind, water, and land. PS 2.1d</p>	<p>Observe plant life cycles and life spans. LE 4.1a,b,c,d</p> <p>Observe that plants reproduce from: LE 4.1 a,b,d</p> <ul style="list-style-type: none"> <li>• Seeds, bulbs and cuttings</li> </ul>
<p>Identify gravity as a force that pulls objects down: PS 5.1c</p> <ul style="list-style-type: none"> <li>• The balance scale</li> <li>• Balance and the center of gravity</li> </ul>	<p>Observe and describe the physical properties of rocks (size, shape, color, presence of fossils). PS 3.1b,c PS 3.1d,e</p>	<p>Describe the basic needs of plants: LE 1.1b</p> <ul style="list-style-type: none"> <li>• Light, air, water, soil (nutrients)</li> </ul>
<p>Observe and describe how the force of gravity can affect objects through air, liquids, and solids. PS 5.2a</p>	<p>Compare and sort rocks by size, color, luster, texture, patterns, hardness/softness. PS 3.1f</p>	<p>Describe the basic life functions of plants: LE 1.1b LE 1.2a LE 4.1b LE 5.1a</p> <ul style="list-style-type: none"> <li>• Grow</li> <li>• Take in nutrients</li> <li>• Reproduce</li> </ul>
	<p>Make clear that nonliving things can be human-created or naturally occurring. LE 1.1d</p>	<p>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). LE 5.2a</p>

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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"> <li>Standard (metric) and nonstandard units</li> <li>Appropriate tools (e.g., rulers, thermometers, pan balances, spring scales, graduated cylinders, beakers)</li> </ul> <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"> <li>Sound</li> <li>Heat</li> <li>Chemical</li> <li>Mechanical</li> <li>Electricity</li> </ul> <p>Identify the evidence for energy transformations and how humans use these energy transformations:</p> <ul style="list-style-type: none"> <li>Heat to light, chemical to electrical, electrical to sound, etc.</li> </ul> <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"> <li>Burning, rubbing (friction), or combining one substance with another.</li> </ul> <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"> <li>Pitch (frequency)</li> <li>Vibrations</li> <li>Volume</li> <li>How sound travels through solids, liquids, gases</li> <li>Noise pollution</li> </ul>	<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"> <li>Lever, pulleys, inclined planes</li> <li>Wheel and axle</li> </ul> <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"> <li>Structures and their functions (e.g., roots, leaves, flowers, etc.)</li> <li>Adaptations of these structures may include variations in size, shape, thickness, color, smell, and texture.</li> <li>Plants change as the seasons change</li> <li>Seed dispersal</li> </ul> <p>Describe how animals must be adapted to their environment in order to survive:</p> <ul style="list-style-type: none"> <li>Structures and their functions (e.g., wings, legs, fins, scales, feathers, fur, etc.)</li> <li>Understand that animals respond to change in the environment (e.g., heart rate, eye blinking, shivering)</li> <li>Animals change as seasons change <ul style="list-style-type: none"> <li>Hibernation</li> <li>Migration (i.e., moving from place to place to meet needs) including human</li> </ul> </li> </ul> <p>Recognize that traits of living things are both:</p> <ul style="list-style-type: none"> <li>Inherited (color of flowers, eye color).</li> <li>Learned/acquired (riding a bicycle, having scars)</li> </ul>

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# grade 4

<b>UNIT 1</b> <b>ANIMALS AND PLANTS IN THEIR ENVIRONMENT</b>	<b>UNIT 2</b> <b>ELECTRICITY AND MAGNETISM</b>	<b>UNIT 3</b> <b>PROPERTIES OF WATER</b>	<b>UNIT 4</b> <b>INTERACTIONS OF AIR, WATER, AND LAND</b>
<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>
Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).	Observe, describe, and investigate the evidence of energy transfer in electrical circuits:	Observe, describe, and explore the physical properties of water:	Observe, investigate, and record examples of physical and chemical weathering.
Explore how plants manufacture food by utilizing air, water, and energy from the sun.	• Simple circuits • Open and closed circuits • Switches	• 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)	Describe how erosional processes (e.g., action of gravity, wind, and water) cause surface changes to the land.
Understand that food supplies energy and materials necessary for growth and repair.	Construct and diagram an electrical circuit.	Explore how different factors affect evaporation.	Investigate, measure, and observe the deposition of earth materials.
Identify populations within a community that are in competition with one another for resources.	Identify conductors and insulators in an electrical circuit.	Describe the Water Cycle.	Describe and illustrate the natural processes by which water is recycled on earth (e.g., ground water, runoff).
Recognize that individual variations within a species may cause certain individuals to have an advantage in surviving and reproducing.	Compare the electrical and magnetic properties of different materials.	Test objects to determine whether they sink or float:	Investigate the negative and positive impact of extreme natural events on living things:
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.	Investigate properties of magnets, including:	• Different materials (plastic, rubber etc.) • Different shapes • Boat design	• Earthquakes • Volcanoes • Hurricanes • Tornadoes • Floods • Fires
Understand that their senses help animals survive.	• 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	Predict, observe, and examine different substances to determine their ability to mix with water (e.g., oil, water; sugar, water; wooden block, water).	Investigate the negative and positive impact of extreme natural events on living things:
Observe that when the environment changes, some plants and animals survive and reproduce, while others die or move to new locations.	Explore the interaction of electricity and magnetism to create an electromagnet.	Examine and describe the transformation of matter from one state to another, e.g., solid water (ice) to liquid (water) to gas (water vapor).	Water is recycled by natural processes on earth.
Describe the way that humans:	• Precipitation • Condensation • Evaporation	• Precipitation • Condensation • Evaporation	Predict and investigate the effect of heat energy on objects and materials. (e.g., change in temperature, melting, evaporation)
• Depend on their natural and constructed environment. • Have changed their environment over time.	Explore the interaction of electricity and magnetism to create an electromagnet.	Describe the physical changes of materials.	Describe the physical changes of materials.
Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).	Describe how electricity can be helpful or harmful to people (safety).		

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# grade 5

<b>UNIT 1</b> <b>THE NATURE OF SCIENCE</b>	<b>UNIT 2</b> <b>EARTH SCIENCE</b>	<b>UNIT 3</b> <b>FOOD AND NUTRITION</b>	<b>UNIT 4</b> <b>EXPLORING ECOSYSTEMS</b>
<i>How do scientists gather and share information?</i>	<i>What are the processes that help shape the land?</i>	<i>How does nutrition and exercise affect our health?</i>	<i>How are plants and animals in an ecosystem connected?</i>
<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; 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. 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 the features on topographic maps. PS 2.1c</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"> <li>Humans need a variety of healthy foods, exercise, and rest in order to grow and maintain good health. LE 5.2a,b, LE 5.2e,f</li> <li>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. LE 5.2e,f</li> <li>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. LE 5.2e,f</li> <li>Food supplies the energy and materials necessary for growth and repair. PS 3.1c,d,e, PS 3.1g</li> </ul>	<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, LE 7.1b</p> <p>Describe the way humans: LE 7.1a,b</p> <ul style="list-style-type: none"> <li>Depend on their natural and constructed environment. LE 7.2b,c</li> <li>Have changed their environment over time. LE 7.2d</li> </ul> <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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<b>UNIT 1</b> <b>THE NATURE OF SCIENCE</b>	<b>UNIT 2</b> <b>EARTH SCIENCE</b>	<b>UNIT 3</b> <b>FOOD AND NUTRITION</b>	<b>UNIT 4</b> <b>EXPLORING ECOSYSTEMS</b>
<p><i>How do scientists gather and share information?</i></p>	<p><i>What are the processes that help shape the land?</i></p>	<p><i>How does nutrition and exercise affect our health?</i></p>	<p><i>How are plants and animals in an ecosystem connected?</i></p>
<p><b>General Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>metric ruler</li> <li>balance</li> <li>stopwatch</li> <li>graduated cylinder</li> <li>thermometer</li> <li>spring scale</li> <li>voltmeter</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Sequence events.</li> <li>Identify cause-and-effect relationships.</li> </ol>	<p><b>General Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>metric ruler</li> <li>balance</li> <li>graduated cylinder</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Classify objects according to an established scheme and a student-generated scheme.</li> <li>Develop and use a dichotomous key.</li> <li>Sequence events.</li> <li>Identify cause-and-effect relationships.</li> </ol> <p style="text-align: right;">(continued)</p>	<p><b>General Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>metric ruler</li> <li>balance</li> <li>stopwatch</li> <li>graduated cylinder</li> <li>thermometer</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Classify objects according to an established scheme and a student-generated scheme.</li> <li>Sequence events.</li> <li>Identify cause-and-effect relationships.</li> <li>Use indicators and interpret results</li> </ol> <p style="text-align: right;">(continued)</p>	<p><b>General Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>metric ruler</li> <li>balance</li> <li>graduated cylinder</li> <li>thermometer</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Classify objects according to an established scheme and a student-generated scheme.</li> <li>Identify cause-and-effect relationships.</li> <li>Use indicators and interpret results.</li> </ol> <p style="text-align: right;">(continued)</p>

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	<p><b>Physical Setting Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.</li> <li>Using identification tests and a flow chart, identify mineral samples.</li> <li>Use a diagram of the rock cycle to determine geological processes that led to the formation of a specific rock type.</li> <li>Plot the location of recent earthquake and volcanic activity on a map and identify patterns of distribution.</li> <li>Generate and interpret field maps including topographic and weather maps.</li> </ol>	<p><b>Living Environment Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.</li> <li>Identify pulse points and pulse rates.</li> <li>Identify structure and function relationships in organisms.</li> </ol>	<p><b>Living Environment Skills</b> (from NYS Core Curriculum)</p> <ol style="list-style-type: none"> <li>Manipulate a compound microscope to view microscopic objects.</li> <li>Determine the size of a microscopic object, using a compound microscope.</li> <li>Prepare a wet mount slide.</li> <li>Use appropriate staining techniques.</li> <li>Classify living things according to a student-generated scheme and an established scheme.</li> <li>Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.</li> </ol>

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<p><b>UNIT 1</b> <b>SIMPLE AND COMPLEX MACHINES</b></p>	<p><b>UNIT 2</b> <b>WEATHER</b></p>	<p><b>UNIT 3</b> <b>DIVERSITY OF LIFE</b></p>	<p><b>UNIT 4</b> <b>INTERDEPENDENCE</b></p>
<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>
<ul style="list-style-type: none"> <li>• Potential and kinetic energy PS 4.1e</li> <li>• Mechanical energy PS 4.1d PS 5.2c</li> <li>• 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</li> <li>• Simple machines include the lever, the pulley, the wheel and axle, and the inclined plane. PS 5.2g</li> <li>• Complex machines PS 5.2g</li> <li>• Transformation of energy within simple and complex machines PS 4.1c PS 5.2c</li> <li>• Principle of the conservation of energy PS 4.5a,b PS 5.2c</li> <li>• Friction and machines PS 5.2d,e</li> </ul>	<p><b>Properties of Matter</b></p> <ul style="list-style-type: none"> <li>• Matter is anything that takes up space and has mass. PS 3.1a</li> <li>• Solids, liquids, and gases PS 3.1a,c-f PS 4.2c</li> <li>• Relationship between phases of matter and particle motion PS 3.1c,f PS 4.2c,d</li> <li>• Density PS 3.1a,h</li> </ul> <p><b>Heating and Cooling Events</b></p> <ul style="list-style-type: none"> <li>• Principle of the conservation of energy PS 4.5a,b</li> <li>• Transfer of heat: radiation, convection, and conduction PS 4.1a PS 4.2a,b</li> <li>• Heat and its relationship to phase changes PS 3.1c PS 3.2a PS 4.2c,d</li> <li>• Expansion and contraction PS 4.2d</li> </ul>	<p><b>Kingdoms of Life</b></p> <ul style="list-style-type: none"> <li>• What makes something “alive”? LE 1.1a</li> <li>• The cell is a basic unit of structure and function of living things. LE 1.1a-c</li> <li>• Unicellular vs. multicellular organisms LE 1.1d-g</li> <li>• Biological classification systems LE 1.1h</li> </ul> <p><b>Food Chains and Food Webs</b></p> <ul style="list-style-type: none"> <li>• Principle of the conservation of energy PS 4.1d PS 4.5a,b</li> <li>• Flow of energy and matter through food chains and food webs LE 5.1c LE 5.2a LE 6.1a-c</li> <li>• Methods for obtaining nutrients LE 5.1d,e LE 5.2b</li> <li>• Role of producers LE 6.2a-c</li> </ul>	<p><b>Climate and Biomes</b></p> <ul style="list-style-type: none"> <li>• Climatic regions PS 2.2j</li> <li>• Biomes: Tundra, Tropical Rain Forest, Temperate Forests, Grasslands, Desert LE 7.1a ICT 1.2, 1.4,4.1</li> <li>• Seasonal variations PS 1.1i</li> <li>• Effect of elevation PS 2.1b</li> <li>• 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</li> </ul> <p><b>Ecosystems and Interdependence</b></p> <ul style="list-style-type: none"> <li>• Populations and definition of species LE 1.1h LE 7.1a</li> <li>• Communities LE 7.1a</li> <li>• Ecosystems (including basic abiotic factors such as water, nitrogen, CO<sub>2</sub>, and oxygen) LE 7.1a LE 7.2a,b ICT 1.2</li> </ul>

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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><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Follow safety procedures in the classroom and laboratory.</li> <li>2. Safely and accurately use the following measurement tools:               <ul style="list-style-type: none"> <li>– metric ruler</li> <li>– spring scale.</li> </ul> </li> <li>3. Use appropriate units for measured or calculated values.</li> <li>4. Recognize and analyze patterns and trends.</li> <li>7. Sequence events.</li> <li>8. Identify cause-and-effect relationships.</li> </ol>	<p><b>Weather</b></p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Light energy vs. heat energy PS 4.1a,c,d PS 4.4a,b</li> <li>• Hydrosphere/atmosphere interactions: Water cycle, Precipitation PS 2.1j</li> <li>• Weather factors: Pressure, relative humidity, temperature, wind PS 2.2l</li> <li>• Air masses and fronts PS 2.2l-p</li> <li>• Extreme weather events: hurricanes, tornadoes, blizzards, drought PS 2.2q</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Follow safety procedures in the classroom and laboratory.</li> </ol>	<ul style="list-style-type: none"> <li>• Role(s) of consumers: idea of respiration/ recycling; herbivores/ carnivores/omnivores. LE 5.1d,e LE 5.2b,c,d</li> <li>• The role of decomposers. LE 5.1e</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Follow safety procedures in the classroom and laboratory.</li> <li>4. Recognize and analyze patterns and trends.</li> <li>6. Develop and use a dichotomous key.</li> <li>7. Sequence events.</li> <li>8. Identify cause-and-effect relationships.</li> </ol> <p><b>Living Environment Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Manipulate a compound microscope to view microscopic objects.</li> <li>2. Determine the size of a microscopic object using a compound microscope.</li> </ol>	<ul style="list-style-type: none"> <li>• Factors affecting the population growth of organisms — Predator/ prey relationships LE 7.1b</li> <li>• Relationships among organisms: beneficial and harmful LE 3.2a LE 7.1c,d LE 7.2c</li> <li>• Effects of environmental changes on humans and other populations LE 7.2a-d LE 7.1e ICT 5.2</li> </ul> <p><b>Adaptations for Survival</b></p> <ul style="list-style-type: none"> <li>• Thermoregulation in plants and animals LE 1.2e LE 5.1a,b,f,g</li> <li>• Locomotion</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Follow safety procedures in the classroom and laboratory.</li> <li>2. Safely and accurately use the following measurement tool:               <ul style="list-style-type: none"> <li>– thermometer.</li> </ul> </li> <li>3. Use appropriate units for measured or calculated values.</li> </ol>

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	<ol style="list-style-type: none"> <li>2. Safely and accurately use the following measurement tools:               <ul style="list-style-type: none"> <li>– metric ruler</li> <li>– balance</li> <li>– graduated cylinder</li> <li>– thermometer.</li> </ul> </li> <li>3. Use appropriate units for measured or calculated values.</li> <li>4. Recognize and analyze patterns and trends.</li> <li>5. Classify objects according to an established scheme and a student-generated scheme.</li> <li>7. Sequence events.</li> <li>8. Identify cause-and-effect relationships.</li> </ol> <p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.</li> <li>7. Generate and interpret field maps including topographic and weather maps.</li> <li>8. Predict the characteristics of an air mass based on the origin of the air mass.</li> <li>9. Measure weather variables such as wind speed and direction, relative humidity, barometric pressure, etc.</li> <li>10. Determine the density of liquids, and regular- and irregular-shaped solids.</li> </ol>	<ol style="list-style-type: none"> <li>6. Classify living things according to a student-generated scheme and an established scheme.</li> <li>7. Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.</li> <li>9. Identify structure and function relationships in organisms.</li> </ol>	<ol style="list-style-type: none"> <li>4. Recognize and analyze patterns and trends.</li> <li>8. Identify cause-and-effect relationships.</li> <li>9. Use indicators and interpret results.</li> </ol> <p><b>Living Environment Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>6. Classify living things according to a student-generated scheme and an established scheme.</li> <li>9. Identify structure and function relationships in organisms.</li> </ol> <p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.</li> <li>5. Use a magnetic compass to find cardinal directions.</li> <li>6. Measure the angular elevation of an object, using appropriate instruments.</li> <li>7. Generate and interpret field maps including topographic and weather maps.</li> </ol>

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# grade 7

UNIT 1 GEOLOGY	UNIT 2 INTERACTIONS BETWEEN MATTER AND ENERGY	UNIT 3 DYNAMIC EQUILIBRIUM: THE HUMAN ANIMAL	UNIT 4 DYNAMIC EQUILIBRIUM: OTHER ORGANISMS
<p><i>How do we as scientists gather and interpret evidence that Earth is continually changing?</i></p>	<p><i>How do the properties and interactions of matter and energy explain physical and chemical change?</i></p>	<p><i>How do human body systems function to maintain homeostasis?</i></p>	<p><i>How is homeostasis maintained in other organisms?</i></p>
<p><b>Earth as a System</b></p> <ul style="list-style-type: none"> <li>Layers and composition: Lithosphere, Hydrosphere, Atmosphere, Biosphere PS 2.1a,c,d PS 2.2b</li> </ul> <p><b>Rocks and Minerals</b></p> <ul style="list-style-type: none"> <li>Rock cycle PS 2.2h</li> <li>Classification of rocks: Sedimentary, metamorphic, and igneous rocks PS 2.2g</li> <li>Properties of minerals including density PS 2.1e</li> <li>Erosion and weathering PS 2.1g-i</li> </ul> <p><b>Fossils and Earth's History</b></p> <ul style="list-style-type: none"> <li>Where fossils are found PS 2.1f</li> <li>Dating of rocks: Absolute and relative age LE 3.2c PS 2.1f</li> <li>The importance of the fossil record LE 3.2b,c PS 2.1f PS 2.2d</li> </ul>	<p><b>Properties of Sound and Light</b></p> <ul style="list-style-type: none"> <li>Electromagnetic energy PS 4.1d PS 4.4a</li> <li>Wave behavior                             <ul style="list-style-type: none"> <li>Light reflection and refraction PS 4.4b</li> <li>Vibrations and sound waves PS 4.4c</li> </ul> </li> </ul> <p><b>Properties of Matter</b></p> <ul style="list-style-type: none"> <li>The properties of materials, such as: density, conductivity, magnetic materials, and solubility PS 3.1a,b,h PS 4.4f,g</li> <li>Elements and compounds PS 3.3e,f</li> <li>Atoms and molecules PS 3.3a-d</li> <li>The Periodic Table as a way of organizing the elements PS 3.3g</li> </ul>	<p><b>Levels of Organization</b></p> <ul style="list-style-type: none"> <li>Cells – structure and function LE 1.1a-d</li> <li>Tissues; organs; systems; organism LE 1.1e,g LE 1.2a,b</li> </ul> <p><b>The Human Body</b></p> <ul style="list-style-type: none"> <li>Maintaining homeostasis: The human body systems                             <ul style="list-style-type: none"> <li>Digestive LE 1.2c</li> <li>Respiratory LE 1.2d</li> <li>Circulatory LE 1.2f</li> <li>Excretory LE 1.2e</li> <li>Skeletal and Muscular LE 1.2g</li> </ul> </li> <li>Obtaining energy LE 5.1c,e LE 5.2a,d</li> <li>Obtaining nutrients LE 5.1d LE 5.2a,b LE 5.2e</li> <li>Regulation of the internal environment LE 5.1f</li> <li>Metabolism LE 5.2c</li> <li>Responding to the external environment (Nervous system) LE 1.2h LE 5.1g</li> </ul>	<p><b>Other Animals</b></p> <ul style="list-style-type: none"> <li>Animal structures and systems LE 1.1g LE 5.1a,b</li> <li>Maintaining homeostasis LE 5.1f LE 5.2e</li> <li>Obtaining energy LE 5.1c,e LE 5.2a</li> <li>Obtaining nutrients LE 5.1d LE 5.2a,b</li> <li>Regulation of the internal environment LE 5.1f</li> <li>Metabolism LE 5.2c</li> <li>Responding to the external environment LE 5.1g</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>Plant structures and systems LE 1.1f LE 5.1a,b</li> <li>Maintaining homeostasis LE 5.1f LE 5.2e</li> <li>Obtaining energy LE 5.1c, LE 5.2a LE 6.2a</li> </ul>

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UNIT 1 GEOLOGY	UNIT 2 INTERACTIONS BETWEEN MATTER AND ENERGY	UNIT 3 DYNAMIC EQUILIBRIUM: THE HUMAN ANIMAL	UNIT 4 DYNAMIC EQUILIBRIUM: OTHER ORGANISMS
<p><i>How do we as scientists gather and interpret evidence that Earth is continually changing?</i></p>	<p><i>How do the properties and interactions of matter and energy explain physical and chemical change?</i></p>	<p><i>How do human body systems function to maintain homeostasis?</i></p>	<p><i>How is homeostasis maintained in other organisms?</i></p>
<p><b>Plate Tectonics</b></p> <ul style="list-style-type: none"> <li>Theory of plate movement and evidence supporting the theory PS 2.2c-e</li> <li>Convection currents PS 2.2e PS 4.2b</li> <li>Buoyancy (relative density) PS 3.1i</li> <li>Sea-floor spreading PS 2.2a,f</li> <li>Earthquakes: faulting and folding of the earth's crust PS 2.2a,c,f</li> <li>Volcanoes PS 2.2a,f</li> <li>Mountain building PS 2.2a,f</li> <li>Topography of Earth's surface PS 2.2a,f</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools:               <ul style="list-style-type: none"> <li>metric ruler</li> <li>balance</li> <li>graduated cylinder.</li> </ul> </li> </ol>	<p><b>Physical and Chemical Changes</b></p> <ul style="list-style-type: none"> <li>Characteristics of physical changes: PS 3.2a               <ul style="list-style-type: none"> <li>Review of phase change/ states of matter PS 3.1c-f</li> <li>Mixtures and solutions PS 3.1g PS 3.2b</li> <li>Temperature and its effect on solubility PS 3.1b PS 4.2e</li> </ul> </li> <li>Characteristics of chemical changes PS 3.2c,d</li> </ul> <p><b>Understanding Chemical Reactions: Photosynthesis and Respiration</b></p> <ul style="list-style-type: none"> <li>Law of Conservation of Mass LE 1.2d LE 5.1c,d LE 5.2a LE 6.2a,b PS 3.2e</li> <li>Energy changes in chemical reactions PS 4.3a</li> <li>Law of Conservation of Energy PS 4.5a,b</li> </ul>	<p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools:               <ul style="list-style-type: none"> <li>metric ruler</li> <li>stopwatch (<i>for pulse rate</i>)</li> <li>thermometer</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Sequence events.</li> <li>Identify cause-and-effect relationships.</li> </ol> <p><b>Living Environment Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Manipulate a compound microscope to view microscopic objects (<i>look at different types of cells and tissues</i>).</li> <li>Determine the size of a microscopic object using a compound microscope.</li> </ol>	<ul style="list-style-type: none"> <li>Obtaining nutrients LE 5.1d LE 5.2a,b</li> <li>Regulation of the internal environment LE 5.1f</li> <li>Metabolism LE 5.2c</li> <li>Responding to the external environment LE 5.1g</li> </ul> <p><b>One-celled Organisms</b></p> <ul style="list-style-type: none"> <li>Unicellular vs. multicellular organisms LE 1.1d,g</li> <li>Maintaining homeostasis LE 5.1f LE 5.2e</li> <li>Obtaining energy LE 5.1c,e</li> <li>Obtaining nutrients LE 5.1d LE 5.2a,b</li> <li>Regulation of the internal environment LE 5.1f</li> <li>Metabolism LE 5.2c</li> <li>Responding to the external environment LE 5.1g</li> </ul>

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grade 7

UNIT 1 GEOLOGY	UNIT 2 INTERACTIONS BETWEEN MATTER AND ENERGY	UNIT 3 DYNAMIC EQUILIBRIUM: THE HUMAN ANIMAL	UNIT 4 DYNAMIC EQUILIBRIUM: OTHER ORGANISMS
<p><i>How do we as scientists gather and interpret evidence that Earth is continually changing?</i></p>	<p><i>How do the properties and interactions of matter and energy explain physical and chemical change?</i></p>	<p><i>How do human body systems function to maintain homeostasis?</i></p>	<p><i>How is homeostasis maintained in other organisms?</i></p>
<p>3. Use appropriate units for measured or calculated values.</p> <p>4. Recognize and analyze patterns and trends.</p> <p>5. Classify objects according to an established scheme and a student-generated scheme.</p> <p>7. Sequence events.</p> <p>9. Use indicators and interpret results.</p> <p><b>Living Environment Skills (from NYS Core Curriculum) (if using microscopes to look at crystals)</b></p> <p>1. Manipulate a compound microscope to view microscopic objects.</p> <p>2. Determine the size of a microscopic object, using a compound microscope.</p> <p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <p>1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.</p>	<p>• Interactions among atoms and/or molecules result in chemical reactions. PS 3.3d</p> <p><b>(PHOTOSYNTHESIS and RESPIRATION)</b></p> <p>• as context for chemical change as well as transformation of energy: light; chemical; heat)</p> <p><b>General Skills (from NYS Core Curriculum)</b></p> <p>1. Follow safety procedures in the classroom and laboratory.</p> <p>2. Safely and accurately use the following measurement tools: – balance – graduated cylinder – thermometer – spring scale – voltmeter.</p> <p>3. Use appropriate units for measured or calculated values.</p>	<p>7. Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web (<i>with regard to nutrients and calories</i>).</p> <p>8. Identify pulse points and pulse rates.</p> <p>9. Identify structure and function relationships in organisms.</p>	<p><b>General Skills (from NYS Core Curriculum)</b></p> <p>1. Follow safety procedures in the classroom and laboratory.</p> <p>2. Safely and accurately use the following measurement tool: – metric ruler.</p> <p>3. Use appropriate units for measured or calculated values.</p> <p>4. Recognize and analyze patterns and trends.</p> <p>5. Classify objects according to an established scheme and a student-generated scheme.</p> <p>6. Develop and use a dichotomous key.</p> <p>7. Sequence events.</p> <p>8. Identify cause-and-effect relationships.</p>

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<p><i>How do we as scientists gather and interpret evidence that Earth is continually changing?</i></p>	<p><i>How do the properties and interactions of matter and energy explain physical and chemical change?</i></p>	<p><i>How do human body systems function to maintain homeostasis?</i></p>	<p><i>How is homeostasis maintained in other organisms?</i></p>
<ol style="list-style-type: none"> <li>2. Using identification tests and a flow chart, identify mineral samples.</li> <li>3. Use a diagram of the rock cycle to determine geological processes that led to the formation of a specific rock type.</li> <li>4. Plot the location of recent earthquake and volcanic activity on a map and identify patterns of distribution.</li> <li>5. Use a magnetic compass to find cardinal directions.</li> <li>6. Measure the angular elevation of an object, using appropriate instruments.</li> <li>7. Generate and interpret field maps including topographic and weather maps.</li> <li>10. Determine the density of liquids, and regular- and irregular-shaped solids.</li> <li>11. Determine the volume of a regular- and an irregular-shaped solid, using water displacement.</li> <li>13. Determine the identity of an unknown element, using physical and chemical properties.</li> </ol>	<ol style="list-style-type: none"> <li>4. Recognize and analyze patterns and trends.</li> <li>5. Classify objects according to an established scheme and a student-generated scheme.</li> <li>7. Sequence events.</li> <li>9. Use indicators and interpret results.</li> </ol> <p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>10. Determine the density of liquids, and regular- and irregular-shaped solids.</li> <li>12. Using the periodic table, identify an element as a metal, nonmetal, or noble gas.</li> <li>13. Determine the identity of an unknown element, using physical and chemical properties.</li> <li>14. Using appropriate resources, separate the parts of a mixture.</li> <li>15. Determine the electrical conductivity of a material, using a simple circuit.</li> </ol>		<p><b>Living Environment Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Manipulate a compound microscope to view microscopic objects.</li> <li>2. Determine the size of a microscopic object using a compound microscope.</li> <li>3. Prepare a wet mount slide.</li> <li>4. Use appropriate staining techniques.</li> <li>6. Classify living things according to a student-generated scheme and an established scheme.</li> <li>9. Identify structure and function relationships in organisms.</li> </ol>

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<p><b>UNIT 1</b> <b>REPRODUCTION, HEREDITY, AND EVOLUTION</b></p>	<p><b>UNIT 2</b> <b>HUMANS IN THEIR ENVIRONMENT: NEEDS AND TRADEOFFS (EXIT PROJECTS)</b></p>	<p><b>UNIT 3</b> <b>EARTH, SUN, MOON SYSTEM</b></p>	<p><b>UNIT 4</b> <b>FORCES AND MOTION ON EARTH</b></p>
<p><i>How does life on Earth continue and adapt in response to environmental change?</i></p>	<p><i>How does human consumption of resources impact the environment and our health?</i></p>	<p><i>What roles do forces play in the patterns and stability of the Solar System?</i></p>	<p><i>How do we apply the laws of motion to explain the movement of objects on Earth?</i></p>
<p><b>Reproductive Patterns and the Continuity of Life</b></p> <ul style="list-style-type: none"> <li>Asexual Reproduction, e.g., Binary fission in unicellular organisms, budding, and vegetative propagation. LE 2.1d LE 4.1a,b</li> <li>Sexual Reproduction – formation of gametes LE 2.1e LE 4.1a,c,d LE 4.2b LE 4.4c</li> <li>Compare and contrast results, contexts, advantages and disadvantages of each method. LE 4.1a</li> </ul> <p><b>Patterns of Development and the Continuity of Life</b></p> <ul style="list-style-type: none"> <li>Patterns of development in plants LE 4.3a,c,e,f</li> <li>Patterns of development in animals LE 4.3a,c,d,f</li> <li>Cell division-growth, maintenance, and repair – Cancer is the result of abnormal cell division LE 4.4a,b LE 4.4d</li> </ul>	<p><b>Natural Resources and Energy</b></p> <ul style="list-style-type: none"> <li>Energy needs LE 3.2a PS 4.1a-d PS 4.4d,e ICT 1.1-1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2 IPS 1.1-1.4 IPS 2.1</li> <li>Renewable and non-renewable sources of energy PS 4.1a,b ICT 5.1, 5.2</li> <li>Material needs LE 3.2a ICT 1.1-1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2 IPS 1.1-1.4 IPS 2.1</li> <li>Renewable and non-renewable sources of materials LE 6.1c ICT 5.1, 5.2</li> </ul>	<p><b>Seasons and Cycles: Relationships Among the Sun, Earth, and Moon</b></p> <ul style="list-style-type: none"> <li>Day: rotation PS 1.1e,h</li> <li>Year: revolution PS 1.1e,h</li> <li>Seasons: tilt of Earth’s axis of rotation PS 1.1i</li> <li>Phases of the Moon PS 1.1g</li> <li>Eclipses PS 1.1e</li> <li>Tides PS 1.1e</li> </ul> <p><b>Solar System</b></p> <ul style="list-style-type: none"> <li>Classification of celestial objects: stars including the sun; planets; comets; moons; and asteroids. PS 1.1a-c,j</li> <li>Patterns of motion, frame of reference and position, direction, and speed. PS 1.1c-i PS 5.1a-c</li> </ul>	<p><b>Motion and Newton’s Laws</b></p> <ul style="list-style-type: none"> <li>Patterns of motion, frame of reference and position, direction, and speed. PS 5.1a,b</li> <li>Newton’s First Law of Motion: Inertia PS 5.1c</li> <li>Newton’s Second Law: <math>F = ma</math> (<i>conceptual understanding as opposed to teaching the formula</i>) PS 5.1d</li> <li>Newton’s Third Law: For every reaction there is an equal and opposite reaction; Force as an interaction PS 5.1e PS 5.2b</li> </ul>

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<p><b>UNIT 1</b> <b>REPRODUCTION, HEREDITY, AND EVOLUTION</b></p>	<p><b>UNIT 2</b> <b>HUMANS IN THEIR ENVIRONMENT: NEEDS AND TRADEOFFS (EXIT PROJECTS)</b></p>	<p><b>UNIT 3</b> <b>EARTH, SUN, MOON SYSTEM</b></p>	<p><b>UNIT 4</b> <b>FORCES AND MOTION ON EARTH</b></p>
<p><i>How does life on Earth continue and adapt in response to environmental change?</i></p>	<p><i>How does human consumption of resources impact the environment and our health?</i></p>	<p><i>What roles do forces play in the patterns and stability of the Solar System?</i></p>	<p><i>How do we apply the laws of motion to explain the movement of objects on Earth?</i></p>
<p><b>Heredity</b></p> <ul style="list-style-type: none"> <li>Genes and DNA LE 2.1a-e</li> <li>Mendelian genetics LE 2.2a-c</li> <li>Mutations LE 3.1a</li> </ul> <p><b>Role of Sexual and Asexual Reproduction in Human Growth and Development</b></p> <ul style="list-style-type: none"> <li>The role of the sperm and egg LE 4.2a,b</li> <li>Human reproductive system LE 1.2i</li> <li>Hormonal regulation: Endocrine system LE 1.2h</li> <li>Patterns of development: cell division and genetic expression LE 4.3b</li> <li>Genetic diseases LE 1.2j</li> <li>Genetic engineering, esp. cloning LE 3.1c, IPS 1.2, 1.3</li> </ul> <p><b>Natural Selection: The Driving Mechanism Behind Evolution</b></p> <ul style="list-style-type: none"> <li>Sources of variation in organisms LE 3.1a</li> <li>Adaptations LE 3.1a-c</li> </ul>	<ul style="list-style-type: none"> <li>Environmental concerns: Acquisition and depletion of resources; Waste disposal; Land use and urban growth; Overpopulation; Global Warming; Ozone depletion; Acid rain; Air pollution; Water pollution; Impact on other organisms LE 3.2b, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1</li> <li>Energy conservation PS 4.5a,b, ICT 1.1-1.4, 2.1-2.3, 4.1, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1</li> </ul> <p><b>Nutrition and Food Choices: Impact on the Environment and on our Health</b></p> <p>Environment:</p> <ul style="list-style-type: none"> <li>Environmental Toxins: pesticides and herbicides; fertilizers; organic waste LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1</li> </ul>	<ul style="list-style-type: none"> <li>Observe, describe, and compare the effects of balanced and unbalanced forces on the motion of objects. PS 1.1c,e,g,h</li> <li>– Newton’s First Law of Motion: Inertia PS 5.1c</li> <li>– gravity PS 1.1d, PS 5.2a</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>– metric ruler</li> <li>– balance</li> <li>– stopwatch</li> <li>– spring scale.</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Identify cause-and-effect relationships.</li> </ol>	<p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <ul style="list-style-type: none"> <li>– metric ruler</li> <li>– balance</li> <li>– stopwatch</li> <li>– spring scale.</li> </ul> </li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Identify cause-and-effect relationships.</li> </ol> <p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Determine the speed and acceleration of a moving object.</li> </ol>

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# grade 8

<b>UNIT 1</b> <b>REPRODUCTION, HEREDITY, AND EVOLUTION</b>	<b>UNIT 2</b> <b>HUMANS IN THEIR ENVIRONMENT: NEEDS AND TRADEOFFS (EXIT PROJECTS)</b>	<b>UNIT 3</b> <b>EARTH, SUN, MOON SYSTEM</b>	<b>UNIT 4</b> <b>FORCES AND MOTION ON EARTH</b>
<p><i>How does life on Earth continue and adapt in response to environmental change?</i></p>	<p><i>How does human consumption of resources impact the environment and our health?</i></p>	<p><i>What roles do forces play in the patterns and stability of the Solar System?</i></p>	<p><i>How do we apply the laws of motion to explain the movement of objects on Earth?</i></p>
<ul style="list-style-type: none"> <li>• Competition LE 3.2a</li> <li>• Extinction LE 3.2b LE 7.2d</li> <li>• Evidence for evolution LE 3.2c,d</li> </ul> <p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Follow safety procedures in the classroom and laboratory.</li> <li>4. Recognize and analyze patterns and trends.</li> <li>7. Sequence events.</li> </ol> <p><b>Living Environment Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Manipulate a compound microscope to view microscopic objects (<i>e.g., look at cells undergoing mitosis</i>).</li> <li>2. Determine the size of a microscopic object using a compound microscope.</li> <li>5. Design and use a Punnett square or a pedigree chart to predict the probability of certain traits.</li> <li>6. Classify living things (<i>evolutionary relationships</i>).</li> </ol>	<ul style="list-style-type: none"> <li>• Endangered species: LE 7.2c,d Habitat destruction, ICT 5.2 over fishing IPS 1.1-1.4 IPS 2.1</li> <li>• Packaging and solid waste ICT 5.2 IPS 1.1-1.4 IPS 2.1</li> <li>• Water issues: depletion; LE 7.2c,d pollution ICT 5.2 IPS 1.1-1.4 IPS 2.1</li> </ul> <p>Homeostasis and Health:</p> <ul style="list-style-type: none"> <li>• Analyzing nutritional value LE 5.2a,b ICT 6.1</li> <li>• Food-borne illness: LE 1.2j Infectious disease and the immune system (bacteria, LE 5.2f parasites) IPS 1.1-1.4 IPS 2.1</li> <li>• System failures: heart disease; high blood pressure; LE 1.2j colon cancer; epidemics LE 4.4d of childhood obesity and LE 5.2f diabetes; osteoporosis IPS 1.1-1.4 IPS 2.1</li> </ul>	<p><b>Physical Setting Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.</li> </ol>	

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<p>8. Identify cause-and-effect relationships.</p> <p>9. Identify structure and function relationships in organisms.</p> <p><b>Genes and DNA</b></p> <p><b>Mendelian genetics</b></p> <p><b>Mutations</b></p>	<p><b>General Skills (from NYS Core Curriculum)</b></p> <ol style="list-style-type: none"> <li>Follow safety procedures in the classroom and laboratory.</li> <li>Safely and accurately use the following measurement tools: <i>(depends on project)</i>.</li> <li>Use appropriate units for measured or calculated values.</li> <li>Recognize and analyze patterns and trends.</li> <li>Sequence events.</li> <li>Identify cause-and-effect relationships.</li> <li>Use indicators and interpret results.</li> </ol> <p>[<b>Note:</b> Physical Setting and Living Environment skills will vary depending on projects pursued.]</p>		

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<p><b>UNIT 1</b>  <b>REPRODUCTION, HEREDITY,  AND EVOLUTION</b></p>	<p><b>UNIT 2</b>  <b>HUMANS IN THEIR ENVIRONMENT:  NEEDS AND TRADEOFFS  (EXIT PROJECTS)</b></p>	<p><b>UNIT 3</b>  <b>EARTH, SUN, MOON  SYSTEM</b></p>	<p><b>UNIT 4</b>  <b>FORCES AND MOTION  ON EARTH</b></p>
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	<p><b>Living Environment</b></p> <p>7. Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.</p> <p>9. Identify structure and function relationships in organisms (within the study of system failures).</p> <p><b>Physical Setting:</b></p> <p>Look for opportunities to address density, as this is a significant concept for the ILSE.</p>		

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# acknowledgments

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