

Grade 1 | Unit 1

Animal Diversity

RECOMMENDED TIME: SEPTEMBER – NOVEMBER (12 WEEKS)

Unit Overview:

Students' ideas about the characteristics of organisms develop from their basic concepts of living and nonliving things. As students investigate the continuity of life, emphasis should be placed on how animals reproduce their own kind. Teachers should lead students to make observations about how the offspring of familiar animals compare to one another and to their parents.

Throughout time, animals have changed depending on their environment. In learning how organisms have been successful in their habitats, students should observe and record information about animals. They should begin to recognize how differences among individuals within a species can help an organism or population to survive. Students at this level will identify the behaviors and physical adaptations that allow organisms to survive in their environment. Students describe animal life cycles and life spans. *[Refer to Appendix A for the Humane Treatment of Animals]*

Essential Question:
How are animals alike and different?

Key Ideas:

LE. Key Idea 1: Living things are both similar to and different from each other and from nonliving things.

LE. Key Idea 2: Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

LE. Key Idea 3: Individual organisms and species change over time.

LE. Key Idea 4: The continuity of life is sustained through reproduction and development.

NYS SCIENCE STANDARDS

<http://www.p12.nysed.gov/ciai/mst/pub/elecoresci.pdf>

Major Understandings:

Quoted from New York State Performance Indicators (LE: 1.1a, 2.1a, 2.2a-b, 3.1a, c, 4.1a, e-g)

- Each animal has different structures that serve different functions in growth, survival, and reproduction. **(3.1a)** 
 - Wings, legs, or fins enable some animals to seek shelter and escape predators
 - The mouth, including teeth, jaws, and tongue, enables some animals to eat and drink.

continued

MST STANDARDS

<http://www.p12.nysed.gov/ciai/mst/pub/elecoresci.pdf>

Standard 2: Information Systems

Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.

continued

NGSS CROSS-CUTTING CONCEPTS

<http://www.nextgenscience.org/sites/ngss/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf>

Patterns:

Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

continued

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<ul style="list-style-type: none"> – Eyes, nose, ears, tongue, and skin of some animals enable the animals to sense their surroundings. – Claws, shells, spines, feathers, fur, scales, and color of body covering enable some animals to protect themselves from predators and other environmental conditions, or enable them to obtain food. – Some animals have parts that are used to produce sounds and smells to help the animal meet its needs. – The characteristics of some animals change as seasonal conditions change (e.g., fur grows and is shed to help regulate body heat; body fat is a form of stored energy and it changes as the seasons change). ■ Animals need air, water, and food in order to live and thrive. (1.1a)  ■ In order to survive in their environment, plants and animals must be adapted to that environment. (3.1c)  <ul style="list-style-type: none"> – Seeds disperse by a plant’s own mechanism and/or in a variety of ways that can include wind, water, and animals. – Animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation, and migration. ■ Plants and animals closely resemble their parents and other individuals in their species. (2.2a) ■ Some traits of living things have been inherited (e.g., color of flowers and number of limbs of animals). (2.1a) ■ Plants and animals can transfer specific traits to their offspring when they reproduce. (2.2b) ■ Plants and animals have life cycles. These may include beginning of a life, development into an adult, reproduction as an adult, and eventually death. (4.1a)  	<p>Standard 6: Interconnectedness: Common Themes</p> <p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p> <p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p> <p>Key Idea 4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).</p> <p>Key Idea 5: Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p> <p>Key Idea 6: In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.</p> <ul style="list-style-type: none"> ■ Each generation of animals goes through changes in form from young to adult. This completed sequence of changes in form is called a life cycle. Some insects change from egg to larva to pupa to adult. (4.1e) ■ Each kind of animal goes through its own stages of growth and development during its life span. (4.1f) ■ The length of time from an animal’s birth to its death is called its life span. Life spans of different animals vary. (4.1g) 	<p>Cause and Effect:</p> <p>Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.</p> <ul style="list-style-type: none"> ■ Events have causes that generate observable patterns. ■ Simple tests can be designed to gather evidence to support or refute student ideas about causes. <p>Systems and System Models:</p> <p>A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> ■ Objects and organisms can be described in terms of their parts. ■ Systems in the natural and designed world have parts that work together. <p>Structure and Function:</p> <p>The way an object is shaped or structured determines many of its properties and functions.</p> <ul style="list-style-type: none"> ■ The shape and stability of structures of natural and designed objects are related to their function(s). <p>Stability and Change:</p> <p>For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.</p> <ul style="list-style-type: none"> ■ Some things stay the same while other things change. ■ Things may change slowly or rapidly.

COMMON CORE STATE STANDARDS

<http://www.corestandards.org/ELA-Literacy/>

http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf

ENVIRONMENTAL GUIDELINES FOR LEARNING

<http://resources.spaces3.com/89c197bf-e630-42b0-ad9a-91f0bc55c72d.pdf>

ELA/Literacy

RI.1.1: Ask and answer questions about key details in a text.

RI.1.2: Identify the main topic and retell key details of a text.

RI.1.4: Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.

RI.1.6: Distinguish between information provided by pictures or other illustrations & information provided by words in a text.

RI.1.7: Use the illustrations and details in a text to describe the key ideas.

RI.1.10: With prompting and support, read informational texts appropriately complex for Grade 1.

W.1.2: Write informative/explanatory texts in which they name a topic, supply some facts about the topic and provide some sense of closure.

L.1.4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on Grade 1 reading and content, choosing flexibility from an array of strategies.

L.1.4A: Use sentence-level context as a clue to the meaning of a word or phrase.

L.1.5.A: Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the category represents.

L.1.5.B: Define words by category and by one or more key attributes (e.g., a duck is a bird that swims; a tiger is a large cat with stripes).

SL.1.1: Participate in collaborative conversations with diverse partners about Grade 1 topics and texts with peers and adults in small and larger groups.

SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

SL.1.3: Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

Mathematics

MP.2: Reason abstractly and quantitatively.

MP.5: Use appropriate tools strategically.

1.MD.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Strand 1: Questioning, Analysis, and Interpretation Skills

1.C. Collecting information

- Learners are able to locate and collect information about the environment and environmental topics.

Strand 2.2: The Living Environment

- Guideline A—Organisms, populations, and communities—Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.
- Guideline B—Heredity and evolution—Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.
- Guideline C—Systems and connections—Learners understand basic ways in which organisms are related to their environments and to other organisms.
- Guideline D—Flow of matter and energy—Learners know that living things need some source of energy to live and grow.

Grade 1 | Unit 2

Properties of Matter

RECOMMENDED TIME: DECEMBER – FEBRUARY (10 WEEKS)

Unit Overview:

Students observe and describe the three states of matter. Students describe, categorize, compare, and measure observable physical properties of matter and objects. Students’ initial efforts in performing these processes may yield simple descriptions and sketches, which may lead to increasingly more detailed drawings and richer verbal descriptions. Appropriate tools can aid students in their efforts.

Essential Question:
How do we describe the properties of matter?

Key Ideas:

PS. Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

PS. Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

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<p>Major Understandings:</p> <p><i>Quoted from New York State Performance Indicators (PS: 2.1c, 3.1c-g, 3.1g, 3.2a, c)</i></p> <ul style="list-style-type: none"> ■ Matter exists in three states: solid, liquid, gas. (3.2a) <ul style="list-style-type: none"> – Solids have a definite shape and volume. – Liquids do not have a definite shape but have a definite volume. – Gases do not hold their shape or volume. ■ Water is recycled by natural processes on Earth. (2.1c)  <ul style="list-style-type: none"> – evaporation: changing of water (liquid) into water vapor (gas) – condensation: changing of water vapor (gas) into water (liquid) – precipitation: rain, sleet, snow, hail <p style="text-align: right;"><i>continued</i></p>	<p>Standard 2: Information Systems</p> <p>Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.</p> <p>Standard 6: Interconnectedness: Common Themes</p> <p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p> <p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p> <p style="text-align: right;"><i>continued</i></p>	<p>Patterns:</p> <p>Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.</p> <ul style="list-style-type: none"> ■ Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. <p>Cause and Effect: Mechanism and Prediction:</p> <p>Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.</p> <ul style="list-style-type: none"> ■ Events have causes that generate observable patterns. ■ Simple tests can be designed to gather evidence to support or refute student ideas about causes. <p style="text-align: right;"><i>continued</i></p>

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<ul style="list-style-type: none"> – runoff: water flowing on Earth’s surface – groundwater: water that moves downward into the ground ■ Changes in the properties or materials of objects can be observed and described. (3.2c) ■ The material(s) an object is made up of determine some specific properties of the object (sink/float, conductivity, magnetism). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders. (3.1e) ■ Objects and/or materials can be sorted or classified according to their properties. (3.1f)  ■ Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light. (3.1c) ■ Measurements can be made with standard metric units and nonstandard units. <i>(Note: Exceptions to the metric system usage are found in meteorology.)</i> (3.1d) ■ Some properties of an object are dependent on the conditions of the present surroundings in which the object exists. (3.1g) <p>For example:</p> <ul style="list-style-type: none"> – temperature: hot or cold – lighting: shadows, color – moisture: wet or dry 	<p>Key Idea 3: The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.</p> <p>Key Idea 4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).</p> <p>Key Idea 5: Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p> <p>Key Idea 6: In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.</p> <p>Standard 7: Interdisciplinary Problem Solving</p> <p>Key Idea 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.</p> <p>Key Idea 2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.</p>	<p>Scale, Proportion, and Quantity:</p> <p>In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.</p> <ul style="list-style-type: none"> ■ Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower). ■ Standard units are used to measure length. <p>Systems and System Models:</p> <p>A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> ■ Objects and organisms can be described in terms of their parts. ■ Systems in the natural and designed world have parts that work together. <p>Energy and Matter:</p> <p>Flows, Cycles, and Conservation: Tracking energy and matter flows into, out of, and within systems helps one understand their system’s behavior.</p> <ul style="list-style-type: none"> ■ Objects may break into smaller pieces, be put together into larger pieces, or change shapes. <p>Structure and Function:</p> <p>The way an object is shaped or structured determines many of its properties and functions.</p> <ul style="list-style-type: none"> ■ The shape and stability of structures of natural and designed objects are related to their function(s).

Stability and Change:

For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

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ENVIRONMENTAL GUIDELINES FOR LEARNING

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Strand 1: Questioning, Analysis, and Interpretation Skills

- Guideline B—Designing investigations—Learners are able to design simple investigations.

Strand 2: Knowledge of Environmental Processes and Systems

Strand 2.1: The Earth as a Physical System

- Guideline A—Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment.
- Guideline B—Changes in matter—Learners are able to identify basic characteristics of and changes in matter.
- Guideline C—Energy—While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.

Mathematics

MP.2: Reason abstractly and quantitatively.

MP.5: Use appropriate tools strategically.

1.MD.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.4: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Grade 1 | Unit 3 Weather and Seasons

RECOMMENDED TIME: MARCH – JUNE (14 WEEKS)

Unit Overview:

Weather involves interactions among air, water, and land. Students should observe and describe weather conditions that occur during each season. They can observe, measure, record and compare data throughout the year by using science tools.

Students should compare temperatures in different locations and compare day and night temperature. Students should illustrate and describe how the sun appears to move during the day. Illustrate and describe how the moon changes appearance over time. Describe the 24-hour day/night cycle. Students should understand that energy exists in a variety of forms. Students should observe and record the changes in the sun's and other star's position, and the moon's appearance relative to time of day and month, and note the pattern of this change. Recognize that the sun's energy warms the air.

Essential Question:
How does seasonal change affect temperature and weather conditions over a period of time?

Key Ideas:

PS. Key Idea 1: The Earth and celestial phenomena can be described by principles of relative motion and perspective.

PS. Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

PS. Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

PS. Key Idea 4: Energy exists in many forms, and when these forms change energy is conserved.

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Major Understandings:

Quoted from New York State Performance Indicators (PS: 1.1a-c, 2.1a-b, 3.1g, 4.2a)

- Natural cycles and patterns include: **(1.1a)** 
 - Earth spinning around once every 24 hours (rotation), resulting in day and night
 - Earth moving in a path around the Sun (revolution), resulting in one Earth year
 - the length of daylight and darkness varying with the seasons.

continued

Standard 2: Information Systems

Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.

Standard 6: Interconnectedness: Common Themes

Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.

continued

Patterns:

Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

continued

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<ul style="list-style-type: none"> – weather changing from day to day and through the seasons – the appearance of the Moon changing as it moves in a path around Earth to complete a single cycle ■ Weather is the condition of the outside air at a particular moment. (2.1a)  ■ Weather can be described and measured by: (2.1b)  <ul style="list-style-type: none"> – temperature – wind speed and direction – form and amount of precipitation – general sky conditions (cloudy, sunny, partly cloudy) ■ Some properties of an object are dependent on the conditions of the present surroundings in which the object exists. (3.1g) <ul style="list-style-type: none"> – temperature: hot or cold – lighting: shadows, color – moisture: wet or dry ■ Humans organize time into units based on natural motions of Earth: (1.1b) <ul style="list-style-type: none"> – second, minute, hour – week, month ■ The Sun and other stars appear to move in a recognizable pattern both daily and seasonally. (1.1c)  ■ Everyday events involve one form of energy being changed to another. (4.2a)  	<p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p> <p>Key Idea 3: The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.</p> <p>Key Idea 4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).</p> <p>Key Idea 5: Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p> <p>Key Idea 6: In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.</p> <p>Standard 7: Interdisciplinary Problem Solving</p> <p>Key Idea 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.</p> <p>Key Idea 2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.</p>	<p>Cause and Effect:</p> <p>Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.</p> <ul style="list-style-type: none"> ■ Events have causes that generate observable patterns. ■ Simple tests can be designed to gather evidence to support or refute student ideas about causes. <p>Scale, Proportion, and Quantity:</p> <p>In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.</p> <ul style="list-style-type: none"> ■ Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower). ■ Standard units are used to measure length. <p>Systems and System Models:</p> <p>A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> ■ Objects and organisms can be described in terms of their parts. ■ Systems in the natural and designed world have parts that work together. <p>Energy and Matter: Flows, Cycles, and Conservation:</p> <p>Tracking energy and matter flows into, out of, and within systems helps one understand their system's behavior.</p> <ul style="list-style-type: none"> ■ Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

continued

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Structure and Function:

The way an object is shaped or structured determines many of its properties and functions.

- The shape and stability of structures of natural and designed objects are related to their function(s).

Stability and Change:

For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

- Some things stay the same while other things change.
- Things may change slowly or rapidly.

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RI 1.7: Use the illustrations and details in a text to describe the key ideas.

RI.1.10: With prompting and support, read informational texts appropriately complex for Grade 1.

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Strand 1: Questioning, Analysis, and Interpretation Skills

- Guideline C—Collecting information—Learners are able to locate and collect information about the environment and environmental topics.
- Guideline F—Working with models and simulations—Learners understand that relationships, patterns, and processes can be represented by models.

Strand 2: Knowledge of Environmental Processes and Systems

Strand 2.4: Environment and Society

- Guideline A—Human/environment interactions—Learners understand that people depend on, change, and are affected by the environment.

SL.1.3: Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

Mathematics

MP.2: Reason abstractly and quantitatively.

MP.5: Use appropriate tools strategically.

1.MD.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.

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