

Grade **K** | Unit **1**

Trees Through the Seasons

RECOMMENDED TIME: SEPTEMBER – NOVEMBER (12 WEEKS)

Unit Overview:

Students observe, compare, and describe the physical properties of trees and their structures throughout the seasons. Students develop a beginning awareness of the characteristics and life cycle of trees and an awareness of trees in their environment. [Refer to Appendix A for Conservation Day]

Essential Question:
How do plants respond to environmental changes?

Key Ideas:

- LE. Key Idea 1:** Living things are both similar to and different from each other and from nonliving things.
- 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.
- LE. Key Idea 5:** Organisms maintain a dynamic equilibrium that sustains life.

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<p>Major Understandings:</p> <p><i>Quoted from New York State Performance Indicators (LE: 1.1b, 1.2a, 3.1b-c, 4.2a, 5.1a, 5.2a)</i></p> <ul style="list-style-type: none"> ■ Plants require air, water, nutrients, and light in order to live and thrive (1.1b).  ■ Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die (1.2a).  ■ Growth is the process by which plants and animals increase in size (4.2a).  ■ All living things grow, take in nutrients, breathe, reproduce, and eliminate waste (5.1a).  ■ Each plant has different structures that serve different functions in growth, survival, and reproduction (3.1b).  <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>Key Idea 2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use.</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>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). <p style="text-align: right;"><i>continued</i></p>

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<ul style="list-style-type: none"> ■ 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. — Leaf, flower, stem, and root adaptations may include variations in size, shape, thickness, color, smell, and texture. ■ Plants respond to changes in their environment. For example, 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 germinate, and leaves form and grow (5.2a).  	<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>	<ul style="list-style-type: none"> ■ 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>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/wp-content/uploads/ELA_Standards.pdf
http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf

ELA/Literacy

RI.K.1: With prompting and support, ask and answer questions about key details in a text.

RI.K.2: With prompting and support, identify the main topic and retell key details of a text.

RI.K.4: With prompting and support, ask and answer questions about unknown words in a text.

RI.K.7: With prompting and support, describe the relationship between illustrations & the text in which they appear.

RI.K.10: Actively engage in group reading activities with purpose and understanding.

W2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

SL.K.3: Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

SL.K.5: Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

Mathematics

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.

K.CC.A: Know number names and the count sequence.

K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.B.3: Classify objects into given categories; count the number of objects in each category and sort the categories by count.

ENVIRONMENTAL GUIDELINES FOR LEARNING

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

Strand 1: Questioning, Analysis, and Interpretation Skills

- Guideline E—Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning 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 **K** | Unit **2** Exploring Properties

RECOMMENDED TIME: DECEMBER – FEBRUARY (10 WEEKS)

Unit Overview:

Students describe, categorize, compare, and measure observable physical properties of matter and objects. Appropriate tools are a necessary component to describe some physical properties of objects.

Essential Question:

How do we observe and describe objects and the physical properties of objects?

Key Ideas:

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 3.1b-g)</i></p> <ul style="list-style-type: none"> ■ Matter has properties that can be observed through the senses. (3.1b) ■ 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. (3.1d) ■ The material(s) an object is made up of determine some specific properties of the object. Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders. (3.1e) <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>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 5: Identifying patterns of change is necessary for making predictions about future behavior and conditions.</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"> ■ 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 ■ Objects and/or materials can be sorted or classified according to their properties (3.1f). 	<p>Standard 7: Interdisciplinary Problem Solving</p> <p>Key Idea 2: Solving interdisciplinary problems involves a variety of skill and strategies including effective work habits; gathering and processing of 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.

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.

Systems and System Models:

A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

- Objects and organisms can be described in terms of their parts.
- Systems in the natural and designed world have parts that work together.

Energy and Matter: Flows, Cycles, and Conservation:

Tracking energy and matter flows into, out of, and within systems helps one understand their system's behavior.

- Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

COMMON CORE STATE STANDARDS

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RI.K.7: With prompting and support, describe the relationship between illustrations and the text in which they appear.

RI.K.10: Actively engage in group reading activities with purpose and understanding.

W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

SL.K.3: Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

SL.K.5: Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

Mathematics

MP.2: Reason abstractly and quantitatively.

K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.A.2: Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.

ENVIRONMENTAL GUIDELINES FOR LEARNING

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

Strand 1: Questioning, Analysis, and Interpretation Skills

- Guideline B—Designing investigations—Learners are able to design simple investigations.
- Guideline E—Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.

Strand 2: Knowledge of Environmental Processes Systems

Strand 2.1: The Earth as a Physical System

- Guideline B—Changes in matter—Learners are able to identify basic characteristics of and changes in matter.

Grade **K** | Unit **3** Animals

RECOMMENDED TIME: MARCH – JUNE (14 WEEKS)

Unit Overview:

As students investigate the continuity of life, emphasis should be placed on how animals reproduce their own kind. 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. The characteristics of the cycle of life vary from organism to organism.

Students need many opportunities to observe a variety of organisms for the patterns of similarities and differences of the life functions used to sustain life. All organisms carry out basic life functions in order to sustain life.

[Refer to Appendix A for the Humane Treatment of Animals]

Essential Question:
How can we compare and contrast animals and nonliving things?

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.

LE. Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.

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, 1.1c, 1.1d, 1.2a, 2.2a, 3.1a, 4.1g, 4.2a, 5.1a, 5.2e, 5.2f)

- Animals need air, water, and food in order to live and thrive. **(1.1a)** 
- Nonliving things do not live and thrive. **(1.1c)** 
- Nonliving things can be human-created or naturally occurring. **(1.1d)** 

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.

Key Idea 2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use.

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

NYS SCIENCE STANDARDS

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- Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die. **(1.2a)** 
- Plants and animals closely resemble their parents and other individuals in their species. **(2.2a)**
- 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
 - 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)
- 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)** 
- Growth is the process by which plants and animals increase in size. **(4.2a)** 
- All living things grow, take in nutrients, breathe, reproduce, and eliminate waste. **(5.1a)** 

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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.

Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.

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.

- Particular animal characteristics are influenced by changing environmental conditions including: fat storage in winter, coat thickness in winter, camouflage, shedding of fur. **(5.2e)** 
- Some animal behaviors are influenced by environmental conditions. These behaviors may include: nest building, hibernating, hunting, migrating, and communicating. **(5.2f)** 

NGSS CROSS-CUTTING CONCEPTS

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Scale, Proportion, and Quantity:

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SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.

Mathematics

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

K.CC Counting and Cardinality

Strand 1: Questioning, Analysis, and Interpretation Skills

- Guideline E—Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning 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 D—Flow of matter and energy—Learners know that living things need some source of energy to live and grow.