NEW YORK STATE LEARNING STANDARD DOCUMENTS

ARTS CDOS ELA HPEF LOTE **MST** SS

NEW YORK STATE LEARNING STANDARDS

MATH SCIENCE & TECHNOLOGY

Content Standard 1 2 3 **4** 5 6 7

SCIENCE (4) Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Area of Study: LIVING ENVIRONMENT

Physical | Living

LEVEL: Elementary

Pre-School | Intermediate | Students with Severe Disabilities | Elementary | Commencement

CORE GUIDE INFORMATION

KEY IDEAS 4 1 2 3 4 5 6 7

MAJOR UNDERSTANDINGS

RESOURCES (SKILLS)

GRADE LEVEL K 1 2 3 4 **K-4**

KEY IDEAS | **PERFORMANCE INDICATORS** | **MAJOR UNDERSTANDINGS**

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

PI 1.1 Describe the characteristics of and variations between living and nonliving things.

PI 1.2 Describe the life process common to all living things.

MU 1.1a Animals need air, water and food in order to live and thrive.
MU 1.1b Plants require air, water, nutrients, and light in order to live and thrive.
MU 1.1c Nonliving things do not live and thrive.
MU 1.1d Nonliving things can be human-created or naturally occurring.

MU 1.2a Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die.

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

PI 2.1 Recognize that traits of living things are both inherited and acquired or learned.

PI 2.2 Recognize that for humans and other living things there is genetic continuity between generations.

MU 2.1a Some traits of living things have been inherited (e.g., color of flowers and number of limbs of animals.
MU 2.1b Some characteristics result from an individual's interaction with the environment and cannot be inherited by the next generation (e.g., having scars, riding a bicycle).

MU 2.2a Plants and animals closely resemble their parents and other individuals in their species.
MU 2.2b Plants and animals can transfer specific traits to their offspring when they reproduce.

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

PI 3.1 Describe how the structure of plants and animals complement the environment of the plant or animal.

PI 3.2 Observe that differences within a species may give individuals an advantage in surviving and reproducing.

MU 3.1a Each animal has different structures that serve different functions in growth, survival, and reproduction.
- 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).

MU 3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.
- roots help support the plant and take in water and nutrients.
- leaves help plants utilize sunlight to make food for the plant.
- stems, stalks, trunks, and other similar structures provide support for the plant.
- some plants have flowers.
- flowers are reproductive structures of plants that produce fruit which contains seeds.
- seeds contain stored food that aids in germination and the growth of young plants.

MU 3.1c In order to survive in their environment, plants and animals must be adapted to that environment.
- 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.
- animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation, and migration.

MU 3.2a Individuals within a species may compete with each other for food, mates, space, water, and shelter in their environment.
MU 3.2b All individuals have variations, and because of these variations, individuals of a species may have an advantage in surviving and reproducing.

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

PI 4.1 Describe the major stages in the life cycles of selected plants and animals.

PI 4.2 Describe evidence of growth, repair, and maintenance, such as nails, hair, and bone, and the healing of cuts and bruises.

MU 4.1a Plants and animals have life cycles. These may include beginning a life, development into an adult, reproduction as an adult, and eventually death.
MU 4.1b Each kind of plant goes through its own stages of growth and development that may include seed, young plant, and mature plant.
MU 4.1c The length of time from beginning of development to death of a plant is called its life span.
MU 4.1d Life cycles of some plants include changes from seed to mature plant.
MU 4.1e Each generation of animals goes through changes in form from young to adult. The completed sequence of changes in form is called a life cycle. Some insects change from egg to larva to pupa to adult.
MU 4.1f Each kind of animal goes through its own stages of growth and development during its life span.
MU 4.1g The length of time from an animal's birth to its death is called its life span. Life spans of different animals vary.

MU 4.2a Growth is the process by which plants and animals increase in size.
MU 4.2b Food supplies the energy and materials necessary for growth and repair.

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

PI 5.1 Describe basic life functions of common living specimens (e.g., guppies, mealworms, gerbils).

PI 5.2 Describe some survival behaviors of common living specimens.

PI 5.3 Describe the factors that help promote good health and growth in humans.

MU 5.1a All living things grow, take in nutrients, breathe, reproduce and eliminate waste.
MU 5.1b An organism's external physical features can enable it to carry out life functions in its particular environment.

MU 5.2a 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.
MU 5.2b Animals respond to change in their environment, (e.g.,perspiration, heart rate, breathing rate, eye blinking, shivering, and salivating).
MU 5.2c Senses can provide essential information (regarding danger, food, mates, etc.) to animals about their environment.
MU 5.2d Some animals, including humans, move from place to place to meet their needs.
MU 5.2e Particular animal characteristics are influenced by changing environmental conditions including: fat storage in winter, coat thickness in winter, camouflage, shedding of fur.
MU 5.2f Some animal behaviors are influenced by environmental conditions. These behaviors may include: nest building, hibernating, hunting, migrating, and communicating.
MU 5.2g 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.

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

Key Idea 6:
Plants and animals depend on each other and their physical environment.

PI 6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment.

PI 6.2 Describe the relationship of the Sun as an energy source for living and nonliving cycles.

MU 6.1a Green plants are producers because they provide the basic food supply for themselves and animals.
MU 6.1b All animals depend on plants. Some animals (predators) eat other animals (prey).
MU 6.1c Animals that eat plants for food may in turn become food for other animals. This sequence is called food chain.
MU 6.1d Decomposers are living things that play a vital role in recycling nutrients.
MU 6.1e An organism's pattern of behavior is related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and other resources, and the physical characteristics of they environment.
MU 6.1f When the environment changes, some plants and animals survive and reproduce, and others die ormove to new locations.

MU 6.2a Plants manufacture food by utilizing air, water, and energy from the Sun.
MU 6.2b The Sun's energy is transferred on Earth from plants to animals through the food chain.
MU 6.2c Heat energy from the Sun powers the water cycle (see Physical Science Key Idea 2)

Key Idea 7:
Human decisions and activities have had a profound impact on the physical and living environment.

PI 7.1 Identify ways in which humans have changed their environment and the effects of those changes.

MU 7.1a Humans depend on their natural and constructed environments.
MU 7.1b Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means to transportation, changing populations, and carrying out other activities.
MU 7.1c Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.

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CORE GUIDE INFORMATION

MAJOR UNDERSTANDINGS | RESOURCES (SKILLS)

GRADE LEVEL K 1 2 3 4 **K-4**

Living Environment
KEY 'OPENINGS'

Key Idea 1

Living things are both similar to and different from each other and from nonliving things.

There are basic characteristics, needs, and functions common to all living things. Nonliving things are present innature or are made by living things. Younger students' ideas about the characteristics of organisms develop from their basic concepts of living and nonliving things. As students are given opportunities to observe and classify living and nonliving things, they should be reminded that living and nonliving things are sometimes given attributes they do not really have. Understanding the variety and complexity of life and its processes can help students develop respect for their own and for all life. It should also lead them to better realize the value of all life on this fragile planet.

Key Idea 2

Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

As students investigate the continuity of life, emphasis should be placed on how plants and 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. Students know that animals reproduce their own kind—rabbits have rabbits (but you can usually tell one baby from another), cats have kittens that have different markings (but cats never have puppies), and so forth. This idea should be strengthened by a large number of examples, both plant and animal, upon which the students can draw. Students should move from describing individuals directly (e.g., she has blue eyes) to naming traits and classifying individuals with respect to those traits (e.g., eye color: blue). Students can be encouraged to keep lists of things that animals and plants get from their parents, things that they don't get, and things that the students are not sure about either way.

Key Idea 3

Individual organisms and species change over time.

Throughout time, plants and animals have changed depending on their environment. In learning how organisms have been successful in their habitats, students should observe and record information about plants and 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.

Key Idea 4

The continuity of life is sustained through reproduction and development.

It is essential for organisms to produce offspring so that their species will continue. Patterns of reproduction, growth, and development of an organism are stages in its life cycle. Life cycle stages are sequential and occur throughout the life span of the organism. The characteristics of the cycle of life vary from organism to organism.

Note: Younger students may have difficulty in recognizing the continuity of life. Using organisms with a short life cycle as examples will be important in getting the concept across. It is important for younger students to observe life cycle changes in selected animals.

Key Idea 5

Organisms maintain a dynamic equilibrium that sustains life.

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. These life functions include growing, taking in nutrients, breathing, reproducing, and eliminating waste. Students need many opportunities to observe and compare these similarities and differences in a variety of organisms. Specimens that could provide these opportunities may include guppies, mealworms, and gerbils, as well as fish, insects, mammals, birds, amphibians, reptiles, plants, and fungi.

Key Idea 6

Plants and animals depend on each other and their physical environment.

Plants and animals interact in a number of ways that affect their survival. The survival of plants and animals varies, in response to their particular environment. As the physical environment changes over time, plants and animals change. Younger students should focus on simple, observable associations of organisms with their environments. Their studies of interactions among organisms within an environment should start with relationships they can directly observe.

Key Idea 7

Human decisions and activities have had a profound impact on the physical and living environments.

Humans are dependent upon and have an impact on their environment. Students should recognize how human decisions cause environmental changes to occur. Students should be given opportunities to identify and investigate the factors that positively or negatively affect the physical environment and its resources.

Living Environment
SAMPLE TASKS

1
- grow a plant or observe a pet, investigating what it requires to stay alive, including evaluating the relative importance and necessity of each item.
- investigate differences in personal body characteristics, such as temperature, pulse, heart rate, blood pressure, and reaction time.

2
- interact with a classroom pet, observe its behaviors, and record what they are able to teach the animal, such as navigation of a maze or performance of tricks, compared to that which remains constant, such as eye color, or number of digits on an appendage.
- use breeding records and photographs of racing horses or pedigreed animals to recognize that variations exist from generation to generation but "like begets like/"

3
- relate physical characteristics of organisms to habitat characteristics (e.g., long hair and fur color change for mammals living in cold climates).
- visit a farm or a zoo and make a written or pictorial comparison of members of a litter and identify characteristics that may provide an advantage.

4
- grow bean plants or butterflies; record and describe stages of development

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5
- observe a single organism over a period of weeks and describe such life functions as moving, eating, resting, and eliminating.
- observe and demonstrate reflexes such as pupil dilation and contraction and relate such relaxes to improve survival.
- analyze the extent to which diet and exercise habits meet cardiovascular, energy, and nutrient requirements.

6
- investigate how humans depend on their environment (neighborhood), by observing, recording, and discussing the interactions that occur in carrying out their everyday lives.
- observe the effects of sunlight on growth for a garden vegetable.

7
- give examples of how inventions and innovations have changed the environment.
- describe benefits and burdens of those changes.

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