Birds, Brains, & Binoculars-

Kindergarten, Unit 1**-**

**MST Standards-Standard 7: Interdisciplinary Problem Solving**

**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.

**NGSS Crosscutting concepts-**

**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.

Unit 2

**NGSS Cross-cutting Standards**

**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.

Unit 3

**NYS Science Standards**

■■ 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)

**Environmental Guidelines for Learning**

**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.

Grade 1 Unit 1-

**Environmental Guidelines for Learning:**

**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.

Grade 2, Unit 3

**Environmental Guidelines for Learning**

**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 other organisms.

■■Guideline D—Flow of matter and energy—Learners know that living things need some source of energy to live and grow.

**Strand 2.4: Environment and Society**

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

■■Guideline C—Resources—Learners understand the basic concepts of resource and resource distribution.

Grade 3, Unit 4-

**NYS Science Standards**

■In order to survive in their environment, plants and animals must be adapted to that environment. (3.1c)

— 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.

■■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)

■■When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations. (6.1f)

Animals respond to change in their environment, (e.g., perspiration, heart rate, breathing rate, eye blinking, shivering, and salivating). (5.2b)

■■Some animals, including humans, move from place to place to meet their needs. (5.2d)

■■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.

**MST Standards**

**Standard 7: Interdisciplinary Problem Solving**

**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.

**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.

**Environmental Guidelines for Learning**

**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 other organisms.

■■Guideline D—Flow of matter and energy—Learners know that living things need some source of energy to live and grow.

**Strand 4: Personal and Civic Responsibility**

■■Guideline A—Understanding societal values and principles – Learners can identify fundamental principles of U.S. society and explain their importance in the context of environmental issues.

■■Guideline D—Accepting personal responsibility—Learners understand that they have responsibility for the effects of their actions.

Grade 4, Unit 1-

**NYS Science Standards**

■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 the environment. (6.1e)

■■Individuals within a species may compete with each other for food, mates, space, water, and shelter in their environment. (3.2a)

■■All individuals have variations, and because of these variations, individuals of a species may have an advantage in surviving and reproducing. (3.2b)

■■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. (5.2g)

■■Senses can provide essential information (regarding danger, food, mates, etc.) to animals about their environment. (5.2c)

■■When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations. (6.1f)

■■Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means of transportation, changing populations, and carrying out other activities. (7.1b)

■■Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms. (7.1c

**NGSS Cross-Cutting Concepts**

**Cause and Effect: Mechanism and Prediction:**

Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which t hey are mediated, is a major activity of science and engineering.

■■Cause and effect relationships are routinely identified, tested, and used to explain change.

■■Events that occur together with regularity might or might not be a cause and effect relationship.

**Scale, Proportion, and Quantity:**

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.

■■Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

■■Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

**Environmental Guidelines for Learning**

**Strand 2.4: Environment and Society**

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

■■Guideline B—Places—Learners understand that places differ in their physical and human characteristics.

■■Guideline E—Environmental issues—Learners are familiar with some local environmental issues and understand that people in other places experience environmental issues as well.

**Strand 3: Skills for Understanding and Addressing Environmental Issues**

**Strand 3.1: Skills for Analyzing and Investigating Environmental Issues**

■■Guideline A—Identifying and investigating issues—Learners are able to identify and investigate issues in their local environments and communities.

Unit 2-

**Environmental Guidelines for Learning**

**Strand 4: Personal and Civic Responsibility**

■■Guideline A—Understanding societal values and principles—Learners can identify fundamental principles of U.S. society and explain their importance in the context of environmental issues.

■■Guideline B—Recognizing citizens’ rights and responsibilities—Learners understand the basic rights and responsibilities of citizenship.

■■Guideline C—Recognizing efficacy—Learners possess a realistic self-confidence in their effectiveness as citizens.

■■Guideline D—Accepting personal responsibility—Learners understand that they have responsibility for the effects of their actions.

Unit 4-

NYS Science Standards

■■ Erosion and deposition result from the interaction among air, water, and land. (2.1d)

— Interaction between air and water breaks down Earth materials.

— Pieces of Earth material may be moved by air, water, wind, and gravity.

— Pieces of Earth material will settle or deposit on land or in the water in different places.

— Soil is composed of broken-down pieces of living and nonliving Earth material.

■■ Water is recycled by natural processes on Earth. (2.1c)

**Environmental Guidelines for Learning**

**Strand 1: Questioning, Analysis, and Interpretation Skills**

■■ Guideline A—Questioning—Learners are able to develop questions that help them learn about the environment and do simple investigations.

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

■■ Guideline C—Collecting information—Learners are able to locate and collect information about the environment and environmental topics.

■■ Guideline D—Evaluating accuracy and reliability—Learners understand the need to use reliable information to answer their questions. They are familiar with some basic factors to consider in judging the merits of information.

■■ 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.

■■ Guideline F—Working with models and simulations—Learners understand that relationships, patterns, and processes can be represented by models.

■■ Guideline G—Drawing conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.

**Common Core Standard**

**SL.4.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 4 topics and texts, building on others’ ideas and expressing their own clearly.

**SL.4.3:** Identify the reasons and evidence a speaker provides to support particular points.

Grade 5, Unit 4-

NYS Science Standards

■■A population consists of all individuals of a species that are found together at a given place and time. Populations in one place form a community. The community and the physical factors with which it interacts compose an ecosystem. (7.1a)

Grade 6, Unit 3**-**

**Environmental Guidelines for Learning**

**Strand 2.2: The Living Environment**

■■ Guideline C—Systems and connections—Learners understand major kinds of interactions among organisms or populations of organisms.

■■ Guideline D—Flow of matter and energy—Learners understand how energy and matter flow among the abiotic and biotic components of the environment**.**

Unit 4

**NYS Science Standards**

Living things are classified by shared characteristics on the cellular and organism level. In classifying organisms, biologists consider details of internal and external structures. Biological classification systems are arranged from general (kingdom) to specific (species). (1.1h)

■■A population consists of all individuals of a species that are found together at a given place and time. Populations living in one place form a community. The community and the physical factors with which it interacts compose an ecosystem.

The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy. (1.2e)

■■ Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition. (5.1a)

■■An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. (5.1b)

■■ Regulation of an organism’s internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required for survival. Regulation includes a variety of nervous and hormonal feedback systems. (5.1f)

■■The survival of an organism depends on its ability to sense and respond to its external environment. (5.1g)

Grade 8, Unit 4-

**NYS Science Standards**

■■ The environment may contain dangerous levels of substances (pollutants) that are harmful to organisms. Therefore, the good health of environments and individuals requires the monitoring of soil, air, and water, and taking steps to keep them safe. (7.1e)

■■ The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace other over time, resulting in longterm gradual changes (ecological succession). (7.2b)