

## New York State Science Learning Standards We Are Guardians

### 3rd Grade

- **3-LS4-3.** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- **3-LS4-4.** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

#### **Disciplinary Core Ideas:**

- LS2.C: Ecosystem Dynamics, Functioning, and Resilience
- LS4.C: Adaptation
- LS4.D: Biodiversity and Humans
- ETS1.B: Developing Possible Solutions

#### **Crosscutting Concepts:**

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1, 3-LS4-3)
- Science assumes consistent patterns in natural systems. (3-LS4-1)
- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)

### 4th Grade

- **4-ESS3-1.** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- **4-LS1-1.** Construct an argument that planets and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

#### **Disciplinary Core Ideas:**

- ESS3.A: Natural Resources
- ETS1.A: Defining Engineering Problems
- LS1.A: Structure and Function
- ESS2.E: Biogeology
- ETS1.B: Designing Solutions to Engineering Problems

#### **Crosscutting Concepts:**

- A system can be described in terms of its components and their interactions. (4-LS1-1, LS1-2)
- Similarities and differences in patterns can be used to sort and classify natural (4-PS4-1)
- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)
- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)



## 5th Grade

- **5-PS3-1.** Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the Sun.
- **5-LS2-1.** Develop a model to describe the movement of matter among plants (producers), animals (consumers), decomposers, and the environment.
- **5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.

### **Disciplinary Core Ideas:**

- PS3.D: Energy in Chemical Processes and Everyday Life
- LS2.A: Interdependent Relationships in Ecosystems
- LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
- ESS2.A: Earth Materials and Systems
- ESS3.C: Human Impacts on Earth Systems
- ETS1.B: Developing Possible Solutions

### **Crosscutting Concepts:**

- A system can be described in terms of its components and their interactions. (5-LS2-1, 5-ESS2-1, 5-ESS3-1)
- Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)
- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)

## Middle School

- **MS-PS2-4.** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- **MS-LS2-2.** Construct an explanation that predicts patterns among organisms in a variety of ecosystems.
- **MS-LS2-3.** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- **MS-LS2-4.** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **MS-LS2-5.** Evaluate competing design solutions for maintaining biodiversity and protecting ecosystem diversity.
- **MS-ESS3-1.** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geologic processes.
- **MS-ESS3-3.** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- **MS-ESS3-4.** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- **MS-ESS3-5.** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

### **Disciplinary Core Ideas:**

- LS1.C: Organization for Matter and Energy Flow in Organisms
- LS2.A: Interdependent Relationships in Ecosystems
- LS2.B: Cycle of Matter and Energy Transfer in Ecosystems
- LS2.C: Ecosystem Dynamics, Functioning, and Resilience



## Middle School (cont'd)

### Disciplinary Core Ideas:

- LS4.D: Biodiversity and Humans
- ETS1.B: Developing Possible Solutions
- ESS2.A: Earth's Minerals and Systems
- ESS2.D: Weather and Climate
- ESS3.A: Natural Resources
- ESS3.C: Human Impacts on Earth Systems
- ESS3.D: Global Climate Change

### Crosscutting Concepts:

- Patterns
- Cause and Effect
- Stability and Change
- Systems and System Models
- Science is a Human Endeavor
- Influence of Science, Engineering, and Technology on the Natural World
- Scientific Knowledge Assumes an Order and Consistency in Natural Systems

## High School

- **HS-PS4-3.** Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model (quantum theory), and that for some situations one model is more useful than the other.
- **HS-PS4-4.** Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
- **HS-LS2-3.** Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in ecosystems.
- **HS-LS2-5.** Develop a model to illustrate the role of various processes in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
- **HS-LS2-6.** Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- **HS-LS2-7.** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
- **HS-ESS3-1.** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- **HS-ESS3-4.** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
- **HS-ESS3-6.** Use a computational representation to illustrate the relationships between Earth systems and how those relationships are being modified due to human activity.

### Disciplinary Core Ideas:

- PS3.D: Energy
- PS4.B: Electromagnetic Radiation
- PS4.C: Information Technologies and Instrumentation
- LS1.C: Organization for Matter and Energy Flow in Organisms
- LS2.A: Interdependent relationships in Ecosystems
- LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
- LS2.C: Ecosystem Dynamics, Functioning, and Resilience



## High School (cont'd)

### *Disciplinary Core Ideas:*

- LS4.D: Biodiversity and Humans
- ESS2.D: Weather and Climate
- ESS3.A: Natural Resources
- ESS3.C: Human Impacts on Earth Systems
- ESS3.D: Global Climate Change
- ETS1.B: Developing Possible Solutions

### *Crosscutting Concepts:*

- Patterns
- Cause and Effect
- Energy and Matter
- Stability and Change
- Systems and System Models
- Science is a Human Endeavor
- Science Addresses Questions About the Natural and Material World
- Interdependence of Science, Engineering, and Technology
- Influence of Engineering, Technology, and Science on Society and the Natural World
- Scientific Knowledge Assumes an Order and Consistency in Natural Systems