K- 2, Next Generation Science Standards (NGSS), Objectives and Alignment with Science4Us

Kindergarten Science

Big Idea: Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-LS1-1.	**Use observations to describe patterns of what plants and animals (including humans) need to survive.** [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and that all living things need water.]	**Living and Nonliving:** Living things have four specific characteristics: they are made up of parts, they use energy to grow, they respond to their environment, and they reproduce. (LS) **Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS)
K-ESS2-2.	**Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs**. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]	**Living and Nonliving:** Living things have four specific characteristics: they are made up of parts, they use energy to grow, they respond to their environment, and they reproduce. (LS) **Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Habitats**: A habitat is made up of the living and nonliving things an animal or plant needs to thrive. (LS) **History of Earth:** Fossils of plants and animals, earthquakes and volcanoes are all evidence of how the Earth has changed over time and continues to change today. (ES)
K-ESS3-1.	**Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live**. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas, and grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Habitats**: A habitat is made up of the living and nonliving things an animal or plant needs to thrive. (LS)
K-ESS3-3.	**Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*** [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]	**Eco Awareness:** We can show that we are eco aware by practicing the three R's of reduce, reuse, and recycle as well as being sensitive to the needs of the other living things that share the environment with us. (LS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Kindergarten Science

Big Idea: Weather and Climate

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-PS3-1.	**Make observations to determine the effect of sunlight on Earth's surface.** [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]	**Weather:** Weather is how hot or cold, or wet or dry, it is outside from day to day. Weather can be observed and measured using tools. (ES) **Materials**: Rocks, water, and soil are some of the materials that make up Earth. (ES)
K-PS3-2.	**Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.*** [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]	**Weather:** Weather is how hot or cold, or wet or dry, it is outside from day to day. Weather can be observed and measured using tools. (ES) **Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I)
K-ESS2-1.	**Use and share observations of local weather conditions to describe patterns over time.** [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]	**Weather:** Weather is how hot or cold, or wet or dry, it is outside from day to day. Weather can be observed and measured using tools. (ES)
K-ESS3-2.	**Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*** [Clarification Statement: Emphasis is on local forms of severe weather.]	**Weather:** Weather is how hot or cold, or wet or dry, it is outside from day to day. Weather can be observed and measured using tools. (ES)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Kindergarten Science

Big Idea: Forces and Interactions: Pushes and Pulls

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-PS2-1.	**Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object**. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]	**Motion:** Motion is a change in position and can be measured by distance and time. (PS) **Force:** Force, a push or a pull, is needed to change the position of an object. (PS)
K-PS2-2.	**Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull**.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]	**Motion:** Motion is a change in position and can be measured by distance and time. (PS) **Force:** Force, a push or a pull, is needed to change the position of an object. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Kindergarten Science

Big Idea: Engineering Design

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-2-ETS1-1.	**Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines (PS):** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance.
K-2-ETS1-2.	**Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.**	**Found throughout modules in interactive online activities, notebooks and offline activities.**
K-2-ETS1-3.	**Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines:** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space Science

Grade 1 Science

Big Idea: Structure, Function and Information Processing

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
1-LS1-1.	**Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*** [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS)
1-LS1-2.	**Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive**. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Habitats**: A habitat is made up of the living and nonliving things an animal or plant needs to thrive. (LS) **Eco Awareness:** We can show that we are eco aware by practicing the three R's of reduce, reuse, and recycle as well as being sensitive to the needs of the other living things that share the environment with us. (LS)
1-LS3-1.	**Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents**. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 1 Science

Big Idea: Structure, Function and Information

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
1-ESS1-1.	**Use observations of the sun, moon, and stars to describe patterns that can be predicted.** [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]	**Earth in Space:** Earth's motion and position in space results in predictable patterns of change, including day/night, seasons and the phases of the Moon. (ES)
1-ESS1-2.	**Make observations at different times of year to relate the amount of daylight to the time of year.** [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]	**Earth in Space:** Earth's motion and position in space results in predictable patterns of change, including day/night, seasons and the phases of the Moon. (ES)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 1 Science

Big Idea: Waves: Light and Sound

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
1-PS4-1.	**Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate**. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]	**Sound**: Sound energy travels in waves and can be described by volume and pitch. (PS)
1-PS4-2.	**Make observations to construct an evidence-based account that objects can be seen only when illuminated**. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]	**Light Energy**: Light energy is energy that can be seen and is generated by natural and manmade sources. (PS)
1-PS4-3.	**Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.** [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]	**Light Energy**: Light energy is energy that can be seen and is generated by natural and manmade sources. (PS)
1-PS4-4.	**Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*** [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]	**Light Energy**: Light energy is energy that can be seen and is generated by natural and manmade sources. (PS) **Sound**: Sound energy travels in waves and can be described by volume and pitch. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 1 Science

Big Idea: Engineering Design

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-2-ETS1-1.	**Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines (PS):** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance.
K-2-ETS1-2.	**Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.**	**Found throughout modules in interactive online activities, notebooks and offline activities.**
K-2-ETS1-3.	**Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines:** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 2 Science

Big Idea: Ecosystems: Interactions, Energy and Dynamics

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
2-LS2-1.	**Plan and conduct an investigation to determine if plants need sunlight and water to grow**	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS)
2-LS2-2.	**Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.**	**Plants:** Plants are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS) **Animals**: Animals are living things that have needs, reproduce, respond to their environment, and are made up of different parts. (LS)

Big Idea: Biological Evolution: Unity and Diversity

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
2-LS4-1.	**Make observations of plants and animals to compare the diversity of life in different habitats**. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitat.]	**Habitats**: A habitat is made up of the living and nonliving things an animal or plant needs to thrive. (LS) **Eco Awareness:** We can show that we are eco aware by practicing the three R's of reduce, reuse, and recycle as well as being sensitive to the needs of the other living things that share the environment with us. (LS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 2 Science

Big Idea: Earth's Systems: Processes that Shape the Earth

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
2-ESS1-1.	**Use information from several sources to provide evidence that Earth events can occur quickly or slowly.** [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.]	**History of Earth Module:** Fossils of plants and animals, earthquakes and volcanoes are all evidence of how the Earth has changed over time and continues to change today. (ES)
2-ESS2-1.	**Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*** [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]	**Materials**: Rocks, water, and soil are some of the materials that make up Earth. (ES) **Features:** Earth's features are the natural shapes on the Earth's crust. Made up of rock or water, they change due to weathering and erosion. (ES)
2-ESS2-2.	**Develop a model to represent the shapes and kinds of land and bodies of water in an area.** [Assessment Boundary: Assessment does not include quantitative scaling in models.]	**Materials**: Rocks, water, and soil are some of the materials that make up Earth. (ES) **Features:** Earth's features are the natural shapes on the Earth's crust. Made up of rock or water, they change due to weathering and erosion. (ES)
2-ESS2-3.	**Obtain information to identify where water is found on Earth and that it can be solid or liquid.**	**Materials**: Rocks, water, and soil are some of the materials that make up Earth. (ES) **Features:** Earth's features are the natural shapes on the Earth's crust. Made up of rock or water, they change due to weathering and erosion. (ES)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 2 Science

Big Idea: Structure and Properties of Matter

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
2-PS1-1.	**Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.** [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]	**Materials and Mixtures:** Everything around us is made up of different materials and can be combined to make mixtures. (PS) **Observing Matter**: Matter has properties that are described using qualitative and quantitative observations. (PS)
2-PS1-2.	**Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.*** [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.]	**Materials and Mixtures:** Everything around us is made up of different materials and can be combined to make mixtures. (PS) **Observing Matter**: Matter has properties that are described using qualitative and quantitative observations. (PS)
2-PS1-3.	**Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.** [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]	**Materials and Mixtures:** Everything around us is made up of different materials and can be combined to make mixtures. (PS) **Observing Matter**: Matter has properties that are described using qualitative and quantitative observations. (PS) **Changes in Matter**: Solids, liquids and gases can undergo changes based on the physical and chemical properties of the matter. (PS)
2-PS1-4.	**Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.** [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]	**Changes in Matter**: Solids, liquids and gases can undergo changes based on the physical and chemical properties of the matter. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

Grade 2 Science

Big Idea: Engineering Design

Objectives	Students who demonstrate understanding can:	Science4Us Instructional Module(s)
K-2-ETS1-1.	**Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines (PS):** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance.
K-2-ETS1-2.	**Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.**	**Found throughout modules in interactive online activities, notebooks and offline activities.**
K-2-ETS1-3.	**Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.**	**Science Tools:** In science, a tool is something you use to collect data, or information. Scientists use tools to help them observe, describe, compare, measure, and communicate. (I) **Simple Machines:** Simple machines are used every day to make work easier by reducing the force needed to move an object over a distance. (PS)

Book Key: I: Inquiry PS = Physical Science LS: Life Science ES: Earth and Space

NGSS Crosscutting Concepts*
Section 2: Crosscutting Concepts Matrix

1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
K-2 Crosscutting Statement
• Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence

2. Cause and Effect: 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.
K-2 Crosscutting Statements
• Events have causes that generate observable patterns. • Simple tests can be designed to gather evidence to support or refute student ideas about causes.

3. 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.
K-2 Crosscutting Statements
• 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.

4. 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.
K-2 Crosscutting Statements
• Objects and organisms can be described in terms of their parts. • Systems in the natural and designed world have parts that work together.

5. 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
K-2 Crosscutting Statement
• Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions
K-2 Crosscutting Statement
• The shape and stability of structures of natural and designed objects are related to their function(s).

7. 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.
K-2 Crosscutting Statements
• Some things stay the same while other things change. • Things may change slowly or rapidly

*** Adapted from: National Research Council (2011). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Committee on a Conceptual Framework for New K-12 Science Education Standards.**
Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academy Press. Chapter 4: Crosscutting Concepts.
April 2013 NGSS Release Page 15 of 17