



# SCIENCE SCOPE & SEQUENCE Pre-K – Grade 2

The Scope and Sequence document represents an articulation of what students should know and be able to do. The document supports teachers in knowing how to help students achieve the goals of the standards and to understand each standard conceptually. It should be used as a tool to assist in planning and implementing a high quality instructional program.

- The units provide a snapshot of instruction across a year.
- The unpacking section contains rich information and examples of what the standards and benchmarks mean.
- The progressions provide valuable information for pre-assessment as well as information on what follows.

## SCIENCE STANDARDS

**Standard 1:** Learners will understand the basic concepts and principles of life science

1. *Organization & Development*
2. *Matter of Energy Transformation*
3. *Interdependence*
4. *Heredity & Reproduction*
5. *Evolution & Diversity*

**Standard 2:** Learners will develop an understanding of concepts, models, theories, universal principles, and the facts that explain the physical world

1. *Properties of Matter*
2. *Changes in Matter*
3. *Forms of Energy*
4. *Energy Transfer & Conservation*
5. *Motion at the Macroscopic Level*
6. *Forces Affecting Motion*

**Standard 3:** Learners will gain an understanding of the origin, evolution and structure of the universe and will gain an understanding of the structure, dynamics, and geophysical systems of the earth

1. *Objects in the Universe*
2. *History of the Earth*
3. *Properties of Earth's Materials*
4. *Tectonics*
5. *Energy in Earth's Systems*
6. *Climate & Weather*

**Standard 4:** Learners will demonstrate an understanding of the nature of scientific inquiry

**Standard 5:** Learners will demonstrate an understanding of the history and the evolution of scientific knowledge

1. *Biogeochemical Cycles*

*Pre-K Units:*

Unit 1	Unit 2
Growing and Caring for Living Things	Exploring Objects and Materials

*Kindergarten Units:*

Unit 1	Unit 2	Unit 3
Forces and Matter	Environmental Studies	Life Cycles

*Grade 1 Units:*

Unit 1	Unit 2	Unit 3
Living Things: Survival	Light and Sound	Sun, Moon, and Stars: Patterns

*Grade 2 Units:*

Unit 1	Unit 2	Unit 3
Plant Biomes	Landforms	Solids, Liquids, and Gases

Standard 1: Learners will understand the basic concepts and principles of life science

Benchmarks LS	Performance Indicators			
	Pre-K	K	Grade 1	Grade 2
	Structure and Function			
<p><b>1.1 (1 LS1-1)</b> 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</p>			All organisms have external parts that they use to perform daily functions.	
	Growth and Development of Organisms			
<p><b>1.2 (1 LS1-2)</b> Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive</p>			Parents and offspring often engage in behaviors that help the offspring survive.	
	Organization for Matter and Energy Flow in Organisms			
<p><b>1.3 (LS 1-1 all)</b> Use observations to describe patterns of what plants and animals, including humans, need to survive</p>	<p>Identify similarities and differences among living and non-living things (color, size, appearance etc). Compare similarities and differences between themselves and peers. Recognize how living things grow and change. Recognize that plants need water and light.</p>	<p>Animals obtain food they need from plants or other animals.</p>		

Information Processing				
1.1 (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			Animals sense and communicate information and respond to inputs with behaviors that help them grow and survive.	
Interdependent Relationships in Ecosystems				
1.4 (2 LS2-1) Plan and conduct and investigation to determine if plants need sunlight and water to grow				Plants depend on water and light to grow and also depend on animals for pollination or to move their seeds around.
1.5 (2 LS2-2) Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants				
Cycles of Matter and Energy Transfer in Ecosystems				
Not assessed at this level				
Ecosystem Dynamics, Functioning and Resilience				
Not assessed at this level				
Inheritance of Traits				
1.6 (1 LS3-1) Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents			Young organisms are very much but not exactly like their parents and also resemble other organisms of the same kind.	
Variation of Traits				
1.6 (1 LS3-1) Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents			Young organisms are very much but not exactly like their parents and also resemble other organisms of the same kind.	

	<b>Social Interactions and Group Behavior</b>			
Not assessed at this level				
	<b>Evidence of Common Ancestry and Diversity</b>			
Not assessed at this level				
	<b>Natural Selection</b>			
Not assessed at this level				
	<b>Adaptation</b>			
Not assessed at this level				
	<b>Biodiversity and Humans</b>			
<b>1.7 (2 LS4-1)</b> Make observations of plants and animals to compare the diversity of life in different habitats				A range of different organisms live in different places.

Standard 2: Learners will develop an understanding of concepts, models, theories, universal principles, and the facts that explain the physical world				
Benchmarks PS	Performance Indicators			
	Pre-K	K	Grade 1	Grade 2
	<b>Structure of Matter (includes Nuclear Processes)</b>			
<b>2.1 (2 PS1-1)</b> Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties	Physical properties of objects and materials. Describe objects by observable properties (size, color, shape, weight, texture). Group objects by observable properties (wood, plastic, metal, cloth and paper; floats/sinks; color, shape, size, weight)			Matter exists as different substances that have observable and different properties.  Different properties are suited to different purposes.  Objects can be built up from smaller parts.
<b>2.2 (2PS1-2)</b> Analyze data obtained from testing different materials to determine which material have the properties that are best suited for an intended purpose				
<b>2.3 (2 PS1-3)</b>				

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				
<b>Chemical Reactions</b>				
<b>2.4 (2 PS1-4)</b> Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot				Heating and cooling substances causes changes that are sometimes reversible and sometimes not.
<b>Forces and Motion</b>				
<b>2.5 (K PS2-1)</b> 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		Pushes and pulls can have different strengths and directions and can change the speed or direction of its motion or start or stop it.		
<b>2.6 (K PS2-2)</b> Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull				
<b>Types of Interactions</b>				
<b>2.6 (K PS2-2)</b> Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull		Pushes and pulls can have different strengths and directions and can change the speed or direction of its motion or start or stop it.		
<b>Definitions of Energy</b>				
<b>Not assessed at this level</b>				

Conservation of Energy and Energy Transfer				
<b>2.7 (K PS3-1)</b> Make observations to determine the effect of sunlight on Earth's surface		Sunlight warms the earth's surface		
<b>2.8 (K PS3-2)</b> Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area				
Relationship between Energy and Forces				
<b>2.5 (K PS2-1)</b> 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		Bigger pushes and pulls cause bigger changes in an objects motion or shape.		
Energy in Chemical Processes and Everyday Life				
<b>2.7 (K PS3-1)</b> Make observations to determine the effect of sunlight on Earth's surface		Sunlight warms the Earth's surface.		
Wave Properties				
<b>2.8 (1 PS4-1)</b> Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate			Sound can make matter vibrate and vibrating matter can make sound.	
Electromagnetic Radiation				
<b>2.9 (1 PS4-2)</b> Make observations to construct an evidence-based account that objects can be seen only when illuminated			Objects can be seen only when light is available to illuminate them.	

<p><b>2.10 (1 PS4-3)</b> Conduct and investigation to determine the effect of placing objects made with different materials in the path of a beam of light</p>				
<b>Information Technologies and Instrumentation</b>				
<p><b>2.11 (1 PS4-4)</b> Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance</p>			People use devices to send and receive information.	

Standard 3: Learners will gain an understanding of the origin, evolution and structure of the universe and will gain an understanding of the structure, dynamics, and geophysical systems of the earth				
Benchmarks	Performance Indicators			
	Pre-K	K	Grade 1	Grade 2
	The Universe and its Stars			
<p><b>3.1 (1 ESS1-1)</b> Use observations of the sun, moon, and start to describe patterns that can be predicted</p>			Patterns of movement of the sun, moon and stars as seen from Earth can be observed, described and predicted.	
<p><b>3.2 (1 ESS1-2)</b> Make observations at different times of year to relate the amount of daylight to the time of the year</p>				
Earth and the Solar System				
<p><b>3.1 (1 ESS1-1)</b> Use observations of the sun, moon, and start to describe patterns that can be predicted</p>			Patterns of movement of the sun, moon and stars as seen from Earth can be observed, described and predicted.	

<p><b>3.2 (1 ESS1-2)</b> Make observations at different times of year to relate the amount of daylight to the time of the year.</p>			Patterns of movement of the sun, moon and stars as seen from Earth can be observed, described and predicted.	
<b>The History of Planet Earth</b>				
<p><b>3.3 (2 ESS 1-1)</b> Make observations from media to construct an evidence-based account that Earth events can occur quickly or slowly</p>				Some events on Earth occur very quickly; others can occur very slowly.
<b>Earth Materials and Systems</b>				
<p><b>3.4 (2 ESS2-1)</b> Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land</p>				Wind and water change the shape of the land.
<b>Plate Tectonics and Large-Scale System Interactions</b>				
<p><b>3.5 (2 ESS2-2)</b> Develop a model to represent the shapes and kinds of land and bodies of water in an area</p>				Maps show where things are located. One can map the shapes and kinds of land and water in any area.
<b>The Role of Water in Earth's Surface Processes</b>				
<p><b>3.6 (2 ESS2-3)</b> Obtain information to identify where water is found on Earth and that it can be solid or liquid</p>				Water is found in many types of places and in different forms on Earth.
<b>Weather and Climate</b>				
<p><b>3.4 (K ESS2-1)</b> Use and share observations of local weather conditions to describe patters over time</p>		Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region and time. People record weather patterns over time.		

<p><b>3.5 (K ESS2-2)</b> Construct an argument, supported by evidence, for how plants and animals - including humans - can change the environment to meet their needs</p>		Plants and animals can change their local environment.		
<b>Natural Resources</b>				
<p><b>3.6 (K ESS3-1)</b> Use a model to represent the relationship between the needs of different plants or animals, including humans, and the places they live</p>		Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.		
<b>Natural Hazards</b>				
<p><b>3.7 (K ESS3-2)</b> Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather</p>		In a region, some kinds of severe weather are more likely than others. Forecasts allow communities to prepare for severe weather.		
<b>Human Impacts on Earth Systems</b>				
<p><b>3.8 (K ESS3-3)</b> Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment</p>		Things people can do affect the environment but they can make choices to reduce their impacts.		
<p><b>3.9</b> Demonstrate an understanding of the Earth's materials.</p>	Identify rocks, soil and water as basic Earth materials. Identify common uses of basic Earth materials.			

Standard 4: Learners will demonstrate an understanding of the nature of scientific inquiry				
Benchmarks	Performance Indicators			
	Pre-K	K	Grade 1	Grade 2
	<b>Developing Possible Solutions</b>			
<b>4.1 (K-2 ETS1.2)</b> 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	Describe objects or events based on observations and experiences.	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people
	<b>Optimizing the Design Solution</b>			
<b>4.2 (K-2 ETS1-3)</b> Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs	Make comparisons among objects.	Demonstrate the ability to use more than one solution to a problem, to compare and test designs	Demonstrate the ability to use more than one solution to a problem, to compare and test designs	Demonstrate the ability to use more than one solution to a problem, to compare and test designs
	<b>Asking Questions and Defining Problems</b>			
<b>4.3 (K-2 ESS3-2 &amp; K-2 ETS1-1)</b> Ask questions based on observations to find more information about the designed world	Ask questions and use senses to explore objects and natural phenomena.	Ask questions and use senses to explore objects and natural phenomena. Define a simple problem that can be solved through the development of a new or improved object or tool	Ask questions and define problems – building on prior experience and progressing to simple descriptive questions that can be tested Define a simple problem that can be solved through the development of a new or improved object or tool	Ask questions and define problems – building on prior experience and progressing to simple descriptive questions that can be tested Define a simple problem that can be solved through the development of a new or improved object or tool

Developing and Using Models				
4.4 (K ESS3-1 & 2 ESS2-2) Use a model to represent relationships in the natural world		Builds on prior experiences and progresses to include using and developing models (i.e diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions		Builds on prior experiences and progresses to include using and developing models (i.e diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions
4.5 (2 LS2-2 & K-2 ETS1-2) Develop a simple model based on evidence to represent a proposed object		Use models to represent relationships in the natural world		Use models to represent relationships in the natural world
Planning and Carrying out Investigations				
4.7 (K PS2-2; 2 PS1-2; K-2 ETS1-3) Analyze data from tests of an object or tool to determine if it works as intended		Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question	Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question	Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question
Using Mathematics and Computational Thinking				
Not assessed at this level				
Constructing Explanations and Designing Solutions				
4.8 (K PS3-2; 1 PS4-4) Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem	Use simple tools (including magnifying glasses, binocular and droppers) safely to expand observational skills.	Use simple tools (including magnifying glasses, binocular and droppers) safely to expand observational skills	Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena	Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena
4.9 (1 PS4-2; 1LS3-1; 2 PS1-3; 2 ESS1-1) Use materials to design a device that solves a specific problem or a solution to a specific problem			Use prior experiences and evidence collected to determine design solutions	Use prior experiences and evidence collected to determine design solutions
4.10 (2 ESS2-1) Compare multiple solutions to a problem				Use evidence and ideas gleaned from construction to explain why a phenomenon has occurred

Engaging in Argument from Evidence				
4.11 (K ESS2-2 & 2 PS1-4) Construct an argument with evidence to support a claim		Engage in argument based on evidence from prior experiences	Engage in argument based on comparison of ideas and representation from natural sources and design	Engage in argument based on comparison of ideas and representation from natural sources and design
Obtaining, Evaluating, and Communicating Information				
4.12 (K ESS3-2 & 1 LS1-2) Read grade appropriate texts and /or use media to obtain scientific information to describe patterns in the natural world		Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information
4.13 (K ESS3-3) Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas	Describe objects or events based on observations and experiences.	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information
4.14 (2 ESS2-3) Obtain information using various texts, text features (e.g. headings, tables of contents, glossaries, electronic menus, icons) and other media that will be useful in answering a scientific question		Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information	Obtain, evaluate and communicate information building on prior experiences and using observations and texts to communicate new information