SUPPORT GUIDE 3.0 FOR KINDERGARTEN

SOUTH CAROLINA ACADEMIC STANDARDS AND PERFORMANCE INDICATORS FOR SCIENCE

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SOUTH CAROLINA
DEPARTMENT OF EDUCATION

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INTRODUCTION TO KINDERGARTEN STANDARDS

Science is a way of understanding the physical universe using observation and experimentation to explain natural phenomena. Science also refers to an organized body of knowledge that includes core ideas to the disciplines and common themes that bridge the disciplines. This document, *South Carolina Academic Standards and Performance Indicators for Science*, contains the academic standards in science for the state's students in kindergarten through grade twelve.

As science educators we must take a 3 dimensional approach in facilitating student learning. By addressing content standards, science and engineering practices and crosscutting concepts, students are able to have relevant and evidence based instruction that can help solve current and future problems. For more information please see: https://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts.

ACADEMIC STANDARDS

In accordance with the South Carolina Education Accountability Act of 1998 (S.C. Code Ann. § 59-18-110), the purpose of academic standards is to provide the basis for the development of local curricula and statewide assessment. Consensually developed academic standards describe for each grade and high school core area the specific areas of student learning that are considered the most important for proficiency in the discipline at the particular level.

Operating procedures for the review and revision of all South Carolina academic standards were jointly developed by staff at the State Department of Education (SCDE) and the Education Oversight Committee (EOC). According to these procedures, a field review of the first draft of the revised South Carolina science standards was conducted from March through May 2013. Feedback from that review and input from the SCDE and EOC review panels was considered and used to develop these standards.

The academic standards in this document are not sequenced for instruction and do not prescribe classroom activities; materials; or instructional strategies, approaches, or practices. The *South Carolina Academic Standards and Performance Indicators for Science* is not a curriculum.

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THE PROFILE OF THE SOUTH CAROLINA GRADUATE

The *2014 South Carolina Academic Standards and Performance Indicators for Science* support the *Profile of the South Carolina Graduate. The Profile of the South Carolina Graduate* has been adopted and approved by the South Carolina Association of School Administrators (SCASA), the South Carolina Chamber of Commerce, the South Carolina Council on Competitiveness, the Education Oversight Committee (EOC), the State Board of Education (SBE), and the South Carolina Department of Education (SCDE) in an effort to identify the knowledge, skills, and characteristics a high school graduate should possess in order to be prepared for success as they enter college or pursue a career. The profile is intended to guide all that is done in support of college- and career-readiness.

Profile of the South Carolina Graduate

World Class Knowledge

- Rigorous standards in language arts and math for career and college readiness
- Multiple languages, science, technology, engineering, mathematics (STEM), arts and social sciences

World Class Skills

- Creativity and innovation
- Critical thinking and problem solving
- Collaboration and teamwork
- Communication, information, media and technology
- Knowing how to learn

Life and Career Characteristics

- Integrity
- Self-direction
- Global perspective
- Perseverance
- Work ethic
- Interpersonal skills

Approved by SCASA Superintendents Roundtable and SC Chamber of Commerce
SC Education Oversight Committee, SC State Board of Education, SC Department of Education,
SC General Assembly, SC Council on Competitiveness, TransformSC, & SC Arts in Basic Curriculum Steering Committee

SCIENCE AND ENGINEERING PRACTICES

In addition to the academic standards, each grade level or high school course explicitly identifies S*cience and Engineering Practice* standards, with indicators that are differentiated across grade levels and core areas. The term "practice" is used instead of the term "skill," to emphasize that scientists and engineers use skill and knowledge simultaneously, not in isolation. These eight science and engineering practices are:

1. Ask questions and define problems
2. Develop and use models
3. Plan and conduct investigations
4. Analyze and interpret data
5. Use mathematical and computational thinking
6. Construct explanations and design solutions
7. Engage in scientific argument from evidence
8. Obtain, evaluate, and communicate information

Students should engage in scientific and engineering practices as a means to learn about the specific topics identified for their grade levels and courses. It is critical that educators understand that the Science and Engineering Practices are ***not*** to be taught in isolation. There should ***not*** be a distinct "Inquiry" unit at the beginning of each school year. Rather, the practices need to be employed ***within the content*** for each grade level or course.

Additionally, an important component of all scientists and engineers' work is communicating their results both by informal and formal speaking and listening, and formal reading and writing. Speaking, listening, reading and writing is important not only for the purpose of sharing results, but because during the processes of reading, speaking, listening and writing, scientists and engineers continue to construct their own knowledge and understanding of meaning and implications of their research. Knowing how one's results connect to previous results and what those connections reveal about the underlying principles is an important part of the scientific discovery process. Therefore, students should similarly be reading, writing, speaking and listening throughout the scientific processes in which they engage.

For additional information regarding the development, use and assessment of the *2014 Academic Standards and Performance Indicators for Science* please see the official document that is posted on the SCDE science web page https://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf.

Support for the guidance, overviews of learning progressions, and explicit details of each SEP can be found in the Science and Engineering Support Document https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf.

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CROSSCUTTING CONCEPTS

Seven common threads or themes are presented in *A Framework for K-12 Science Education* (2012). These concepts connect knowledge across the science disciplines (biology, chemistry, physics, earth and space science) and have value to both scientists and engineers because they identify universal properties and processes found in all disciplines. These crosscutting concepts are:

1. Patterns
2. Cause and Effect: Mechanism and Explanation
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter: Flows, Cycles, and Conservation
6. Structure and Function
7. Stability and Change

These concepts should not to be taught in isolation but reinforced in the context of instruction within the core science content for each grade level or course.

The link http://www.nap.edu/read/13165/chapter/8 provides support from the framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012) that gives further guidance on each crosscutting concept.

1. **Patterns:** The National Research Council (2012) states that "observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them" (p. 84).
2. **Cause and Effect: Mechanism and Explanation:** The National Research Council (2012) states that "events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts" (p. 84).
3. **Scale, Proportion, and Quantity:** The National Research Council (2012) states that "in considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance" (p. 84).
4. **Systems and Systems Models:** The National Research Council (2012) states that "Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering" (p. 84).
5. **Energy and Matter:** Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
6. **Structure and Function:** The National Research Council (2012) states that "the way in which an object or living thing is shaped and its substructure determine many of its properties and functions" (p. 84).
7. **Stability and Change:** The National Research Council (2012) states that "For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study" (p. 84).

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DECIPHERING THE STANDARDS

Kindergarten
Life Science: Exploring Organisms and the Environment

Standard K.L.2: The student will demonstrate an understanding of the effects of forces on the motion and stability of an object.

K.L.2A. Conceptual Understanding: The environment consists of many types of organisms including plants, animals, and fungi. Organisms depend on the land, water, and air to live and grow. Plants need water and light to make their own food. Fungi and animals cannot make their own food and get energy from other sources. Animals (including humans) use different body parts to obtain food and other resources needed to grow and survive. Organisms live in areas where their needs for air, water, nutrients, and shelter are met.

Performance Indicators: Students who demonstrate this understanding can:

K.L.2A.1 Obtain information to answer questions about different organisms found in the environment (such as plants, animals, or fungi).

Figure 1: Example from the Kindergarten Standards

The code assigned to each performance indicator within the standards is designed to provide information about the content of the indicator. For example, the **K.L.2A.1** indicator decodes as the following:

K: The first part of each indicator denotes the grade or subject. The example indicator is from Kindergarten. The key for grade levels are as follows:

K: Kindergarten
1: First Grade
2: Second Grade
3: Third Grade
4: Fourth Grade
5: Fifth Grade
6: Sixth Grade
7: Seventh Grade
8: Eighth Grade
H.B: High school Biology I
H.B: High School Chemistry I
H.P: High school Physics I
H.E: High School Earth Science

L: After the grade or subject, the content area is denoted by an uppercase letter. The L in the example indicator means that the content covers Life Science. The key for content areas are as follows:
E: Earth Science
EC: Ecology
L: Life Science
P: Physical Science
S: Science and Engineering Practices

2: The number following the content area denotes the specific academic standard. In the example, the 2 in the indicator means that it is within the second academic standard with the Kindergarten science content.

A: After the specific content standard, the conceptual understanding is denoted by an uppercase letter. The conceptual understanding is a statement of the core idea for which students should demonstrate understanding. There may be more than one conceptual understanding per academic standard. The A in the example means that this is the first conceptual understanding for the standard. Additionally, the conceptual understandings are novel to the *2014 South Carolina Academic Standards and Performance Indicators for Science*.

1: The last part of the code denotes the number of the specific performance indicator. Performance indicators are statements of what students can do to demonstrate knowledge of the conceptual understanding. The example discussed is the first performance indicator within the conceptual understanding.

CORE AREAS OF GRADE KINDERGARTEN

- Life Science: Exploring Organisms and the Environment
- Earth Science: Exploring Weather Patterns
- Physical Science: Exploring Properties of Objects and Materials

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CONTENT SUPPORT GUIDE
FOR KINDERGARTEN
SOUTH CAROLINA ACADEMIC STANDARDS AND PERFORMANCE INDICATORS

INTRODUCTION

Local districts, schools and teachers may use this document to construct standards-based science curriculum, allowing them to add or expand topics they feel are important and to organize content to fit their students' needs and match available instructional materials. The support document includes standard, conceptual understanding, performance indicator, science and engineering practices, crosscutting concepts, essential learning experiences, extended learning experiences, assessment guidelines, learning connections, and in some cases note to teacher.

FORMAT OF THE CONTENT SUPPORT GUIDE

The format of this document is designed to be structurally uniformed for each of the academic standards and performance indicators. For each, you will find the following sections--

Standard

- This section provides the standard being explicated.

Conceptual Understanding

- This section provides the overall understanding that the student should possess as related to the standard. Additionally, the conceptual understandings are novel to the *2014 South Carolina Academic Standards and Performance Indicators for Science*.

Performance Indicator

- This section provides a specific set of content with an associated science and engineering practice for which the student must demonstrate mastery.

Science and Engineering Practices (SEPs)

- This section lists the specific science and engineering practice that are paired with the content in the performance indicator. Educators should reference the chapter on this specific science and engineering practice in the *Science and Engineering Practices Support Guide.*
- Educators have the freedom to enhance SEPs addressed during instruction.
- SEPs Support Guide https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Crosscutting Concepts (CCCs)

- Cross Cutting Concepts (http://www.nap.edu/read/13165/chapter/8) This link provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012).
- Educators have the freedom to enhance CCCs addressed during instruction.

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Essential Learning Experiences

- This section illustrates the knowledge of the content contained in the performance indicator for which it is fundamental for students to demonstrate mastery.

Note to Teacher

- If necessary or appropriate, this section provides additional instructional guidance.

Extended Learning Experiences

- This section provides educators with topics that will enrich students' knowledge related to topics learned with the explicated performance indicator.

Assessment Guidelines

- This section provides guidelines for educators and assessors to check for student mastery of content utilizing interrelated science and engineering practices.

Learning Connections

- This section provides a list of academic content along with the associated academic standard that students will have received in prior or will experience in future grade levels.

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Life Science: Exploring Organisms and the Environment

Standard K.L.2: The student will demonstrate an understanding of organisms found in the environment and how these organisms depend on the environment to meet those needs.	
K.L.2A. Conceptual Understanding: The environment consists of many types of organisms including plants, animals, and fungi. Organisms depend on the land, water, and air to live and grow. Plants need water and light to make their own food. Fungi and animals cannot make their own food and get energy from other sources. Animals (including humans) use different body parts to obtain food and other resources needed to grow and survive. Organisms live in areas where their needs for air, water, nutrients, and shelter are met.	
Performance Indicator	**K.L.2A.1:** Obtain information to answer questions about different organisms found in the environment (such as plants, animals, or fungi).
Science and Engineering Practice	**K.S.1A.8:** Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions, (2) understand phenomena, (3) develop models, or (4) support explanations, claims, or designs. Communicate observations and explanations using the conventions and expectations of oral and written language.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to obtain and evaluate information through the use of informational text, observations, data collection, or discussions regarding what animals, plants, and fungi need to live and grow. This could include, but is not limited to students surveying their schoolyard environment and generating questions about the organisms they find. With teacher guidance, students will research the answers to their questions. In addition students need to know

- There are many types of organisms found in the world around us. An organism is something that is alive. Animals are organisms that cannot make their own food, but are able to move from place to place to find food from other sources. Plants are organisms that use light and water to make their own food, but cannot move. Fungi are organisms that cannot make their own food, can move around, and get their food by eating dead or decaying plants or animals.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Construct explanations that explain why organisms can be classified as plants,

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animals, or fungi.

Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **5.L.4B.1:** Analyze and interpret data to explain how organisms obtain their energy and classify an organism as producers, consumers (including herbivore, carnivore, and omnivore), or decomposers (such as fungi and bacteria).

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Life Science: Exploring Organisms and the Environment

Standard K.L.2 The student will demonstrate an understanding of organisms found in the ironment and how these organisms depend on the environment to meet those needs.	
K.L.2A. Conceptual Understanding: The environment consists of many types of organisms including plants, animals, and fungi. Organisms depend on the land, water, and air to live and grow. Plants need water and light to make their own food. Fungi and animals cannot make their own food and get energy from other sources. Animals (including humans) use different body parts to obtain food and other resources needed to grow and survive. Organisms live in areas where their needs for air, water, nutrients, and shelter are met.	
Performance Indicator	**K.L.2A.2:** Conduct structured investigations to determine what plants need to live and grow (including water and light).
Science and Engineering Practice	**K.S.1A.3:** With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to make qualitative observations and take nonstandard measurements, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to conduct structured investigations with teacher guidance in order to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to make qualitative observations and take nonstandard measurements, and (4) record and represent data in an appropriate form. This could include but is not limited to having students plant several seeds and provide some seeds with different things that they need, while withholding specific needs from other seeds.

NOTE TO TEACHER: There are many misconceptions concerning living and nonliving things at this developmental level. To assist students in their understanding whether something is an organism, they should ask:

- Does it need air?
- Does it need water?
- Does it need food?
- Does it need shelter/space?
- Is it able to make another living thing like itself?

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Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Understanding how plants make food and/or air

Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **1.L.5B.1:** Conduct structured investigations to answer questions about what plants need to live and grow (including air, water, sunlight, minerals, and space).

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Life Science: Exploring Organisms and the Environment

Standard K.L.2 The student will demonstrate an understanding of organisms found in the environment and how these organisms depend on the environment to meet those needs.	
K.L.2A. Conceptual Understanding: The environment consists of many types of organisms including plants, animals, and fungi. Organisms depend on the land, water, and air to live and grow. Plants need water and light to make their own food. Fungi and animals cannot make their own food and get energy from other sources. Animals (including humans) use different body parts to obtain food and other resources needed to grow and survive. Organisms live in areas where their needs for air, water, nutrients, and shelter are met.	
Performance Indicator	**K.L.2A.3:** Develop and use models to exemplify how animals use their body parts to (1) obtain food and other resources, (2) protect themselves, and (3) move from place to place.
Science and Engineering Practice	**K.S.1A.2:** Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to develop and use models to assist their understanding of the following concepts:

- Animals use body parts to meet their needs for obtaining food, water, air, and shelter.
  - Mouths/beaks
  - Noses/Gills
  - Tongues
  - Shells
- Protecting themselves
  - Claws
  - Teeth
  - Scales
  - Shell
  - Tails
- Moving themselves
  - Wings
  - Fins
  - Legs
  - Tails

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Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal, but can be used by teachers to extend the depth and rigor of student engagements.

- Conduct structured investigations with teacher guidance to determine how the body parts of various animals help the animal obtain food or other resources, protect themselves, or move from place to place.

Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **2.L.5A.2:** Structures of different animals help them survive including structures for seeing and hearing.

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Life Science: Exploring Organisms and the Environment

Standard K.L.2 The student will demonstrate an understanding of organisms found in the environment and how these organisms depend on the environment to meet those needs.	
K.L.2A. Conceptual Understanding: The environment consists of many types of organisms including plants, animals, and fungi. Organisms depend on the land, water, and air to live and grow. Plants need water and light to make their own food. Fungi and animals cannot make their own food and get energy from other sources. Animals (including humans) use different body parts to obtain food and other resources needed to grow and survive. Organisms live in areas where their needs for air, water, nutrients, and shelter are met.	
Performance Indicator	**K.L.2A.4:** Analyze and interpret data to describe how humans use their senses to learn about the world around them.
Science and Engineering Practice	**K.S.1A.4:** Analyze and interpret data from observations, measurements, or investigations to understand patterns and meaning.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to analyze and interpret data to assist their understanding of the way humans interact with the world through the use of their senses. To accomplish this goal students need to know:
There are five senses, each with specific parts of the body (sensory organs) responsible for each of the five senses.

- Eyes
  - The sensory organs that see.
  - They take in information (for example, shapes, colors, size or movements) about the world.
- Nose
  - The sensory organ that smells odors and is a big part of why a person is able to taste things.
- Ears
  - The sensory organs that collect sounds.
  - The part of the ear that can be seen collects the sounds a person hears. There are other parts inside the ear that help with hearing.
- Tongue
  - The sensory organ responsible for taste.

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- Skin
    - The sensory organ that is responsible for the sense of touch (including shape, texture, and hardness). It covers and protects everything inside the body.
    - The skin holds everything together.
    - Skin also helps keep the body at just the right temperature.

NOTE TO TEACHER: This may be an appropriate opportunity for students to represent data using object and picture graphs, and then use those graphs to draw conclusions. In addition, students may benefit from the opportunity to sort and classify data into 2 or 3 categories with data not to exceed 20 items in each category.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Conduct structured investigations with teacher guidance to determine how the tongue recognizes different types of taste – sour, bitter, sweet, and salty.

Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **2.L.5A.2:** Structures of different animals help them survive including structures for seeing and hearing **4.L.5B.1:** Compare how humans and other animals use their senses and sensory organs to detect and respond to signals from the environment.

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Life Science: Exploring Organisms and the Environment

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Performance Indicator	**K.L.2A.5** Construct explanations from observations of what animals need to survive and grow (including air, water, nutrients, and shelter).
Science and Engineering Practice	**K.S.1A.6** Construct explanations of phenomena using (1) student - generated observations and measurements, (2) results of investigations, or (3) data communicated in graphs, tables, or diagrams.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page number 6. Patterns Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to observe animals in a habitat so that they are able to construct explanations about the basic needs of organisms or living things, and what is necessary for their survival. Organisms depend on the land, water, and air to live and grow. Animals need air, water, food, and shelter for protection.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Conduct structured investigations with teacher guidance to determine what happens to animals when one or more of their basic needs are not met.
- Develop a model depicting what various animals need to survive.

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Assessment Guidelines:
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https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **2.L.5A.2:** Structures of different animals help them survive including structures for seeing and hearing.

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Life Science: Exploring Organisms and the Environment

Standard K.L.2 The student will demonstrate an understanding of organisms found in the environment and how these organisms depend on the environment to meet those needs.	
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Performance Indicator	**K.L.2A.6:** Obtain and communicate information about the needs of organisms to explain why they live in particular areas.
Science and Engineering Practice	**K.S.1A.8:** Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations using oral and written language.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Structure and Function

Essential Learning Experiences:
It is essential for students to obtain information about the needs of organisms and communicate that information through observations, data collection, and/or discussions. Further, students need to know that organisms live in areas where their needs for air, water, nutrients, and shelter are met. For example, fish do not breathe air, so they must live in water. Frogs need water in which to lay their eggs, but most can live on land. A cactus can live in a dry area because it stores water. This information will help students provide explanations for why organisms live in particular areas.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Develop a model depicting how distinct body features of particular animals allow them to survive in particular areas.

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Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

Learning Connections	**Future Learning Connections (1-5):** **1.L.5B.2:** Characteristics of plants for distinct environments (deserts, forests, and grasslands) **2.L.5B.2:** Characteristics of animals for distinct environments (salt and freshwater, deserts, forests, wetlands, or polar lands) **3.L.5A.1:** Physical factors (light, temperature, water, soil, and space for shelter and reproduction) of environments (salt water, fresh water, deserts, grasslands, forests, rainforests, polar regions)

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Earth Science: Exploring Weather Patterns

Standard K.E.3 The student will demonstrate an understanding of daily and seasonal weather patterns.	
K.E.3A. Conceptual Understanding: Weather is a combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. Scientists measure weather conditions to describe and record the weather and to notice patterns over time. Plants and animals (including humans) respond to different weather conditions in different ways.	
Performance Indicator	**K.E.3A.1:** Analyze and interpret local weather condition data (including precipitation, wind, temperature, and cloud cover) to describe weather patterns that occur from day to day, using simple graphs and pictorial weather symbols.
Science and Engineering Practice	**K.S.1A.4:** Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Stability and Change

Essential Learning Experiences:
It is essential for students to analyze and interpret local weather data using simple graphs and picture symbols to recognize that weather changes on a daily basis. There are many different types of weather conditions, for example, sunny, rainy, stormy, snowy, cloudy, windy, hot, wet, or cold.

NOTE TO TEACHER: This may be an appropriate opportunity for students to represent data using object and/or picture graphs, and then have students draw conclusions from the graphs.

Students should collect weather data DAILY through direct observations for the following weather conditions:

- Precipitation
  - Anytime a form of water falls from the sky, it is called precipitation.
  - Using their observations, students can describe precipitation as:
    - Rain (water drops)
    - Snow (flakes of ice)
    - Sleet (tiny frozen ice pellets)
    - Hail (larger balls of ice, usually during strong thunderstorms)

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- Wind
  - Moving air is called wind.
  - Wind conditions can be described as:
    - No wind
    - Some wind
    - Strong wind
  - Wind can be observed using flags, making simple wind gauges, looking at leaves on trees, etc.
- Temperature
  - Temperature is a weather condition that describes how hot or cold the air feels outside.
  - Using observations students can describe temperature as:
    - Hot
    - Warm
    - Cool
    - Cold
  - Students can describe how it feels when outside and chart their observations using simple graphs or charts.
  - Students can begin to compare their verbal descriptions of the temperature with temperature measurements using thermometers or weather data from websites (such as weather.com)
- Cloud Cover
  - Using their observations of the sky, students can describe how cloudy the sky appears.
  - Cloud cover can be described as follows:
    - Cloudy (nearly completely covered)
    - Partly Cloudy (some clouds)
    - Clear/Sunny (none or very few clouds)
    - Foggy (cloud cover at ground level)

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Weather conditions may vary in other parts of the country or world.
- General weather patterns for specific regions in the United States (I.E. longer winter weather in northern states; drier weather conditions in Midwest states, etc.)

Assessment Guidelines:
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https://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf

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Learning Connections	**Future Learning Connections (1-5):** **1.E.3:** An understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth **2.E.2:** An understanding of daily and seasonal weather patterns **4.E.2:** An understanding of the water cycle and weather and climate patterns **4.E.3:** An understanding of the locations, movements, and patterns of stars and objects in the solar system

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Earth Science: Exploring Weather Patterns

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Performance Indicator	**K.E.3A.2:** Develop and use models to predict seasonal weather patterns and changes.
Science and Engineering Practice	**K.S.1A.2:** Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Stability and Change

Essential Learning Experiences:
It is essential for students to develop and use models to understand that changes in the weather follow a repeating pattern which are called seasons. Further they need to know the four seasons are fall (autumn), winter, spring, and summer.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Collect formal data such as amount of rainfall or temperature.

Assessment Guidelines:
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Learning Connections	**Future Learning Connections (1-5):** **1.E.3:** An understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth **2.E.2:** An understanding of daily and seasonal weather patterns **4.E.2:** An understanding of the water cycle and weather and climate patterns **4.E.3:** An understanding of the locations, movements, and patterns of stars and objects in the solar system

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Earth Science: Exploring Weather Patterns

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Performance Indicator	**K.E.3A.3:** Obtain and communicate information to support claims about how changes in seasons affect plants and animals.
Science and Engineering Practice	**K.S.1A.8:** Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop mode ls, or (4) support explanations. Communicate observations and explanations using oral and written language.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Stability and Change

Essential Learning Experiences:
It is essential for students to use observations, data collection, informational text, and discussions to come to an understanding that changing seasons affect plant and animals through the following examples:

- Examples of ways seasons affect plants are as follows:
  - Some trees will stay green all year (evergreens) and some trees lose their leaves each autumn/fall and grow them back in the spring.
  - Some leaves change color and fall off during the autumn/fall season.
  - Some plants form leaf buds and flower buds and bloom in the spring season.
  - Some plants, like trees, have full grown green leaves during the summer.
- Examples of ways seasons affect animals are as follows:
  - Some animals, like squirrels, store food for the winter season.
  - Some animals grow warm winter coats and shed that fur when the temperatures warm up.
  - Some birds fly to a warmer place before the winter season and return in the spring.
  - Some animals, like bears, hibernate in the winter.

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Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Classify deciduous and evergreen trees. Evergreens do shed (for example, pine trees are evergreens that shed needles but constantly grow new ones that stay green all year long). It is the deciduous trees that lose their leaves each autumn (fall) and grow them back in the spring.
- Determine which animals hibernate.

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Earth Science: Exploring Weather Patterns

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Performance Indicator	**K.E.3A.4:** Define problems caused by the effects of weather on human activities and design solutions or devices to solve the problem.
Science and Engineering Practice	**K.S.1B.1:** Construct devices or design solutions to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the devices or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem, and (6) communicate the results.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Stability and Change

Essential Learning Experiences:
It is essential for students to construct a device or design a solution that will lead them to an understanding that weather has an effect on human activities.
Examples include:

- Farming (lack of/surplus of rain affects crops)
- selecting clothes (shorts or pants, short sleeve shirt or long sleeve shirt, coats, hat; thinner fabrics {t-shirt} or thicker fabrics {sweater})
- rain/storms (use of umbrella, rain coat, rain boots)
- vacations (planning for the appropriate seasons)

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Safety precautions for severe weather

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Assessment Guidelines:
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Learning Connections	**Future Learning Connections (1-5):** **1.E.3:** An understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth **2.E.2:** An understanding of daily and seasonal weather patterns **4.E.2:** An understanding of the water cycle and weather and climate patterns **4.E.3:** An understanding of the water cycle and weather and climate patterns

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Physical Science: Exploring Properties of Objects and Materials

Standard K.P.4 The student will demonstrate an understanding of the observable properties of matter.	
K.P.4A. Conceptual Understanding: Objects can be described and classified by their observable properties, by their uses, and by whether they occur naturally or are manufactured (human-made). Different properties of objects are suited for different purposes.	
Performance Indicator	**K.P.4A.1** Analyze and interpret data to compare the qualitative properties of objects (such as size, shape, color, texture, weight, flexibility, attraction to magnets, or ability to sink or float) and classify objects based on similar properties.
Science and Engineering Practice	**K.S.1A.4:** Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Systems and Systems Models Stability and Change

Essential Learning Experiences:
It is essential for students to use observations, measurements, and/or investigations to analyze and interpret data as a means of understanding patterns and meanings involving properties of objects that are observable. Making observations is a way of learning about the world around us.

- A *scientific observation* is one that anyone can make and the result will always be the same. For example, the plant is green, has three leaves, and is smooth.
- An *observation that is not scientific*, or an opinion, is one that not everyone may agree on. For example, the flower is pretty.
- Observing does not mean just looking at something. It involves the use of one or more of the five senses (seeing, hearing, smelling, touching, and tasting) using appropriate observation methods for each sense, such as wafting an odor so that its smell can be described or gently touching the edges of seashells to determine their textures.
- Tasting in science should only be done with the permission of the teacher under controlled conditions.
- Observing helps to find out about objects (their characteristics, properties, differences, similarities) and events (what comes first or last, or what is happening at a particular moment).

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Data about the qualitative properties of a collection of objects can be analyzed in order to look for patterns, common characteristics, and differences. *Qualitative (observable) properties* are properties that can be distinguished through observing with the senses, including:

- Size
  - Making observations is a way of learning about the world around us.
  - Objects can be classified by size when compared with other objects.
- Shape
  - Objects can be classified according to their basic shape.
- Color
  - Objects can be classified by their color.
- Texture
  - Texture describes the way something feels to the touch.
  - Objects can be classified by texture. Examples of texture words include soft, hard, rough, and smooth.
- Weight
  - At this level, students can compare the weight (quantity of mass) of one object to another by using a pan balance. They are not required to actually measure the weight of the objects, but can explain that one object is heavier or lighter than another.
- Flexibility
  - Flexibility is the ability of an object to bend, especially without breaking.
  - Objects can be classified by their flexibility.
- Magnetic attraction
  - Magnets are attracted to objects that contain iron.
  - Magnets ARE NOT attracted to all metallic-looking objects.
  - Objects can be classified as magnetic or not magnetic based on whether or not a magnet is attracted (sticks) to it.
- Sinking
  - Sinking means to stay near the bottom of a liquid.
- Floating
  - Floating means to stay near the top of a liquid.

NOTE TO TEACHER: This may be an appropriate opportunity for students to sort and classify data into 2 or 3 categories with data not to exceed 20 items in each category. Scientific tools or materials used to describe observable properties include a magnifier, ruler, balance, and magnets.

Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Quantitative observations are measurable properties that can be distinguished by measuring and/or counting, such as length, width, and height.

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Assessment Guidelines:
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Learning Connections	**Future Learning Connections (1-5):** **2.P.3:** The student will demonstrate an understanding of the observable properties of solids and liquids and the special properties of magnets. **3.P.2:** The student will demonstrate an understanding of the properties used to classify matter and how heat energy can change matter from one state to another. **5.P.2:** The student will demonstrate an understanding of the physical properties of matter and mixtures.

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Physical Science: Exploring Properties of Objects and Materials

Standard K.P.4 The student will demonstrate an understanding of the observable properties of matter.	
K.P.4A. Conceptual Understanding: Objects can be described and classified by their observable properties, by their uses, and by whether they occur naturally or are manufactured (human-made). Different properties of objects are suited for different purposes.	
Performance Indicator	**K.P.4A.2:** Develop and use models to describe and compare the properties of different materials (including wood, plastic, metal, cloth, and paper) and classify materials by their observable properties, by their uses, and by whether they are natural or human-made.
Science and Engineering Practice	**K.S.1A.2:** Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Systems and Systems Models Stability and Change

Essential Learning Experiences:
It is essential for students to know that objects are made of different materials. These materials have different properties.

- Properties that can be used to describe, compare, and classify objects are size, shape, color, texture, weight, flexibility, attraction to magnets, or the ability to sink or float in water.
- Materials from which objects are made can include wood, plastic, metal, cloth, and paper.
- Similarities and differences between these materials can be made based on their properties, uses, and how they are made (i.e. made naturally or made by humans).
- Materials can be natural (sticks or twigs) or human-made (plastic bottles).
- Materials have a variety of uses (Ex. Wood: furniture, toys, pencils)

NOTE TO TEACHER: Scientific tools or materials used to describe observable properties include a magnifier, ruler, balance, and magnets.

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Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- Solids and liquids are two types of matter that have distinct observable properties. Some matter can be mixed together and then separated again. Solids and liquids can change from one form to another when heat is added or removed.

Assessment Guidelines:
Students should engage in multiple science and engineering practices when interacting with the content outlined in this performance indicator. For further information please see SEP Support Guide at:
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Learning Connections	**Future Learning Connections (1-5):** **2.P.3**: The student will demonstrate an understanding of the observable properties of solids and liquids and the special properties of magnets. **3.P.2**: The student will demonstrate an understanding of the properties used to classify matter and how heat energy can change matter from one state to another. **5.P.2**: The student will demonstrate an understanding of the physical properties of matter and mixtures.

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Physical Science: Exploring Properties of Objects and Materials

Standard K.P.4 The student will demonstrate an understanding of the observable properties of matter.	
K.P.4A. Conceptual Understanding: Objects can be described and classified by their observable properties, by their uses, and by whether they occur naturally or are manufactured (human-made). Different properties of objects are suited for different purposes.	
Performance Indicator	**K.P.4A.3**: Conduct structured investigations to answer questions about which materials have the properties that are best suited to solve a problem or need.
Science and Engineering Practice	**K.S.1A.3:** With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to make qualitative observations and take nonstandard measurements, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
Crosscutting Concepts	The following Crosscutting Concepts may be applied to the content of this indicator. For more information see page 6. Patterns Cause and Effect Systems and Systems Models Stability and Change

Essential Learning Experiences:
It is essential for students to know that clear directions for a scientific investigation may include instructions to:

- Develop a testable question.
- Predict possible outcomes.
- Identify appropriate tools, instruments, materials, and procedures.
- Make quantitative observations (see K.P.4A.1).
- Record and represent data and observations
- Communicate observations (for example through verbal discussion, pictures, diagrams, note-booking, etc.)

To make a *prediction*:

- Make observations and think about what is known about the object or event.
- Tell what will happen next.

For example, using processes described above, have students determine which material would best keep your head dry when it is raining outside (i.e. size, shape, and composition).

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Extended Learning Experiences:
The following knowledge and learning experiences are not essential to the success of this learning goal but can be used by teachers to extend the depth and rigor of student engagements.

- It is not essential for students to go beyond this level of knowledge at this time.

Assessment Guidelines:
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Learning Connections	**Future Learning Connections (1-5):** **2.P.3**: The student will demonstrate an understanding of the observable properties of solids and liquids and the special properties of magnets. **3.P.2:** The student will demonstrate an understanding of the properties used to classify matter and how heat energy can change matter from one state to another. **5.P.2:** The student will demonstrate an understanding of the physical properties of matter and mixtures.

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