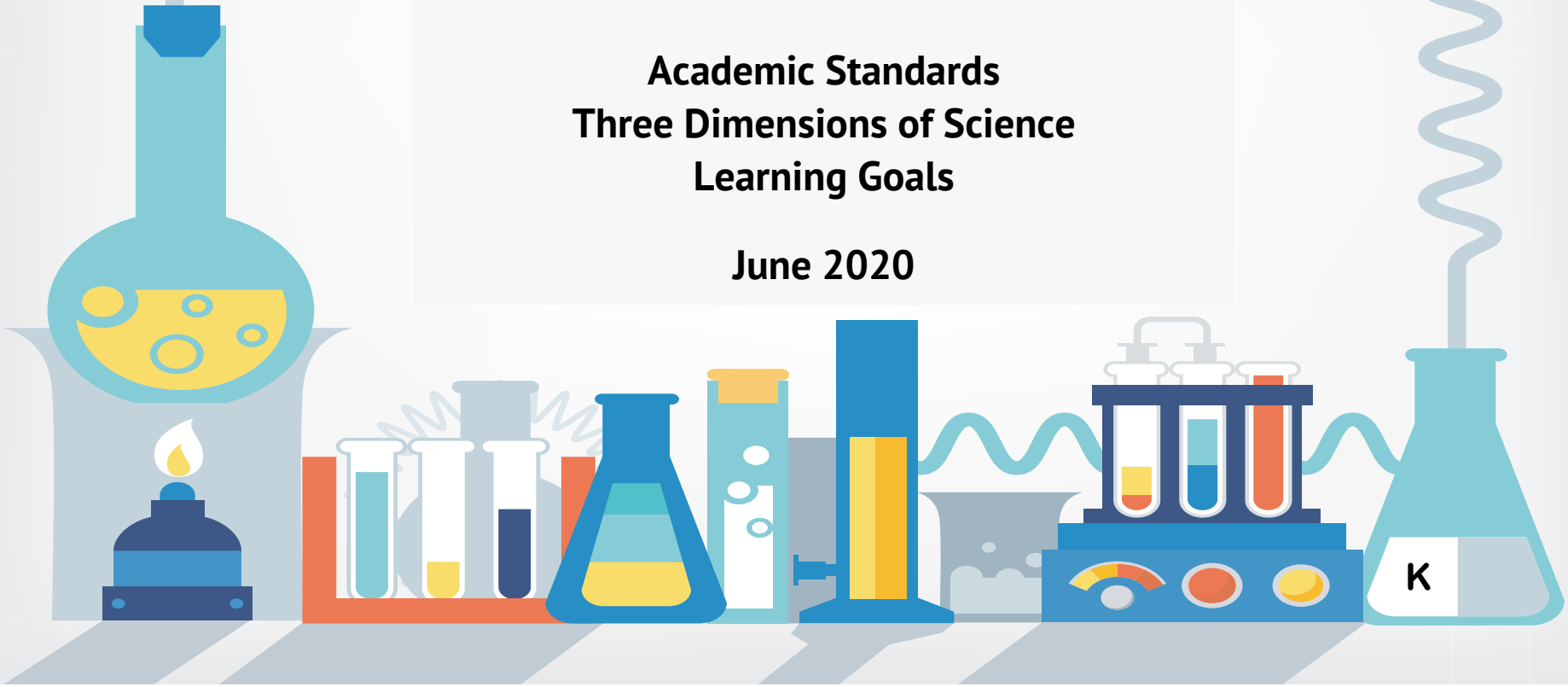
ENVISION 21

DEEP LEARNING • CFSD

SCIENCE

Academic Standards
Three Dimensions of Science
Learning Goals

June 2020



KINDERGARTEN

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN OVERVIEW

By the end of kindergarten, students learn to use their senses to help them make observations and predictions about the world around them. In this grade level, students will investigate how the senses detect light and sound, observe weather patterns and their influences on plants and animals, and differentiate between systems and structures of living and non-living things. Student investigations focus on collecting and making sense of observational data and simple measurements using the science and engineering practices. While individual lessons may include connections to any of the crosscutting concepts, the standards in kindergarten focus on helping students understand phenomena through the crosscutting concepts of *patterns* and *structure and function*.

The kindergarten standards are grouped by area of science and topic. They are a *progression* of disciplinary core ideas. Some of the sub-ideas within the disciplinary core ideas (background information) overlap; there is not always a clear division between those ideas. Instead of focusing on distinctly different content or processes at each grade level, the standards engage students in similar topics to develop a progressively deeper understanding of each of the three science dimensions. Students continually build on and revise their knowledge and skills over time. In addition, there is a focus on a limited number of core ideas (content) both within and across the science disciplines. This was done intentionally to avoid the shallow coverage of a large number of topics, and to allow more time for teachers and students to explore each idea in greater depth.

The kindergarten standards have been organized by area of science and suggested topics. However, this does not indicate the instructional sequence or how the standards will be organized for instruction. Educators will make decisions about instructional sequence and how standards will be grouped by units for classroom instruction and assessment to best meet student needs.

	Area of Science	Title	Content
1	Physical Science	Senses	Students explore how their senses can detect light, sound, and vibration and how technology can be used to extend their senses.
2	Earth and Space Sciences	Weather & Seasons	Students develop an understanding of patterns to understand changes in local weather and seasons.
3	Earth and Space Sciences	Sun, Moon, & Stars	Students develop an understanding of patterns to recognize and understand changes in daylight.
4	Life Science	Living & Non-Living Things	Students develop an understanding that the world is comprised of living and non-living things. They investigate the relationship between structure and function in living things; plants and animals use specialized parts to help them meet their needs and survive.
5	Computer Science	Computational Thinking & Data and Analysis	Students develop a foundation of computer science knowledge and new approaches to problem solving that capture the power of computational thinking to become both users and creators of computing technology.

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Navigating the Science Standards: Abbreviated Version

The standards serve as the basis for the design of instruction and assessment of the district's science curriculum.

- **Standards** are what a student needs to know, understand, and be able to do by the end of each grade or course. They build across grade levels in a progression of increasing understanding and through a range of cognitive demand levels.
- **Curriculum** refers to the resources used for teaching and learning the standards (units, lessons, texts, materials, tech apps, assessments, etc.).
- **Instruction** refers to the methods or methodologies used by teachers to teach their students. Instructional techniques are employed by individual teachers in response to the needs of students in their classes to help them progress through the curriculum to achieve the standards.

Grade Level or Course and **Topic Area** for standard.

Standard – What is Assessed
Describes what students should be able to do at the end of instruction to show what they have learned. Combines Science and Engineering Practices, Core Ideas, and Crosscutting Concepts.

Learning Goals
Indicators or evidence of learning at the end of a lesson or unit as aligned to the standard.

Core Ideas for Knowing and Using Science
"Understandings" or big ideas for physical, earth and space, and life sciences that build in complexity across grade levels and students develop over time.

Background Information (Content) is provided under each Core Idea

Science and Engineering Practices
Skills and knowledge that scientists and engineers engage in to either understand the world or solve a problem.

KINDERGARTEN

LIFE SCIENCE: LIVING AND NON-LIVING THINGS

Students develop an understanding that the world is comprised of living and non-living things. They investigate the relationship between structure and function in living things; plants and animals use specialized parts to help them meet their needs and survive.

Science Standard: K.L2U1.8 **Observe, ask questions, and explain the differences between the characteristics of living and non-living things.**

Learning Goals

I can:

- Based on prior experiences, ask questions about living and non-living things.
- Make direct or indirect observations about living and non-living things:
  - Identify traits of living and non-living things.
  - Record observations (*e.g., through pictures and/or words*).
  - Make inferences about the characteristics of living and non-living things.
- List the characteristics of living things (*i.e., move, reproduce, react to stimuli*).
- Use evidence to explain how the characteristics of living things differ from the characteristics of non-living things.

Core Ideas

Knowing Science

L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.

- There is a wide variety of living things (organisms), including plants and animals. They are distinguished from non-living things by their ability to move, reproduce, and react to certain stimuli.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of living and non-living things.
- Students make observations about living and non-living things.
- Students use the evidence from their observations to make inferences about the characteristics of living and non-living things.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations of the natural and/or designed world.

Constructing Explanations and Designing Solutions

- Use information from direct or indirect observations to construct explanations.
- Distinguish between opinions and evidence in one's own explanations.

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

Systems and System Models

- Objects and organisms can be described in terms of their parts.

Life Science
Description of what students will learn for the area of science under study (K-8 only.

Three Dimensions (3-D) of Science:
The Practices, Core Ideas, and Crosscutting Concepts that were used to create the standards.

Crosscutting Concepts
Concepts that cut across all disciplines and help students deepen their understanding of core ideas.

PHYSICAL SCIENCE

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

PHYSICAL SCIENCE: SENSES

Students explore how their senses can detect light, sound, and vibration and how technology can be used to extend their senses.

Science Standard: K.P2U1.1 Investigate how senses can detect light, sound, and vibrations even when they come from far away; use the collected evidence to develop and support an explanation.

Learning Goals

I can:

- Investigate (*e.g., through experimentation, texts, media, demonstrations*) how senses can detect light, sound, and vibrations even when they come from far away:
  - Identify questions relevant to the investigation.
  - Based on prior experiences, make predictions related to the investigative question.
  - Determine an appropriate method of observation in an investigation.
  - Make direct and/or indirect observations about light, sound, and/or vibrations in an investigation:
    - Use senses to identify features and details of a phenomenon (*e.g., color, size, shape, sound, movement, etc.*).
    - Make measurements of phenomena related to the detection of light, sound, and vibrations.
    - Collect and record (*e.g., through pictures and/or words*) relevant evidence in an investigation.
    - Make inferences based on observations.
- Use the collected evidence to develop and support an explanation:
  - Use evidence to explain how objects that are seen either give out or reflect light that human eyes can detect.
  - Use evidence to explain how light allows us to see with our eyes.
  - Use evidence to explain how our ears detect sound (*i.e., when the vibrations in the air enter our ears*).
  - Use evidence to explain how sound comes from things that vibrate.
  - Use evidence to explain how sound can be detected at a distance (*i.e., because the air or other material around is made to vibrate*).

Core Ideas

Knowing Science

P2: Objects can affect other objects at a distance.

- Light, sound, and vibrations can be detected even when we are not in contact with the objects that have produced them.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students make observations during an investigation to explore phenomena related to the senses' ability to detect light, sound, and vibrations even from far away.
- Students use evidence from their investigations to develop an explanation.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world.	**Cause and Effect: Mechanism and Prediction** • Simple tests can be designed to gather evidence to support or refute student ideas

Planning and Carrying out Investigations • With guidance, design and conduct investigations in collaboration with peers. • Design and conduct investigations collaboratively. **Constructing Explanations and Designing Solutions** • Use information from direct or indirect observations to construct explanations.	about causes.

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

PHYSICAL SCIENCE: SENSES

Students explore how their senses can detect light, sound, and vibration and how technology can be used to extend their senses.

Science Standard: K.P2U2.2 Design and evaluate a tool that helps people extend their senses.

Learning Goals

I can:

- Use provided materials to design a tool to extend people's sense of sight, hearing, and/or touch:
  - Identify the design challenge.
  - Identify goals for the design.
  - Use a sketch, draft, and/or physical model to communicate the design.
  - Generate multiple potential design solutions.
- Evaluate a tool that helps people extend their senses:
  - Use criteria to evaluate the effectiveness of a tool to help extend the senses.
  - Discuss strengths and weaknesses of different designs.

Core Ideas

Knowing Science

P2: Objects can affect other objects at a distance.

- People use a variety of devices to communicate (send and receive information) over long distances. These devices extend our senses.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students develop a tool using the design process: they define the problem; identify goals for their design; identify multiple possible solutions; and choose a method of communication for their designs.
- Students evaluate their tools using criteria and identify strengths and weaknesses of multiple designs.

Science and Engineering Practices

Asking Questions and Defining Problems

- Define a simple problem that can be solved through the development of a new or improved object or tool.

Constructing Explanations and Designing Solutions

- Use tools and materials provided to design a device or solution to a specific problem.

Obtaining, Evaluating, and Communicating Information

- Critique/communicate information, design ideas, or solutions with others in oral and/or written forms using models, drawings, writings, or numbers.

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

EARTH AND SPACE SCIENCES

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

EARTH AND SPACE SCIENCES: WEATHER & SEASONS

Students develop an understanding of patterns to understand changes in local weather and seasonal cycles.

Science Standard: K.E1U1.3 Observe, record, and ask questions about temperature, precipitation, and other weather data to identify patterns or changes in local weather.

Learning Goals

I can:

- Ask questions about local weather based on prior experiences.
- Make observations about the weather (*i.e., temperature, precipitation, air pressure, wind direction, wind speed, water vapor*):
  - Use senses to identify features or details of weather phenomena.
  - Take measurements of weather phenomena (*e.g., using a barometer, thermometer, rain gauge, wind vane, etc.*).
  - Record data about the weather (*e.g., through pictures and/or words*).
  - Make inferences about weather patterns based on observations.
- Use data collected over time to identify patterns or changes in local weather.

Core Ideas

Knowing Science

E1: The composition of the earth and its atmosphere and the natural and human processes occurring within them shape the earth's surface and its climate.

- Weather is determined by the conditions and movement of the air. The temperature, pressure, direction, speed of movement and the amount of water vapor in the air combine to create the weather.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of local weather.
- Students make observations about local weather and collect weather data.
- Students use the evidence from their observations to identify patterns and changes, helping them make sense of phenomena in local weather.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations of the natural and/or designed world.

Using Mathematics and Computational Thinking

- Use counting and numbers to identify and describe patterns in the natural and/or designed world.

Analyzing and Interpreting Data

- Use and share pictures, drawings, and/or writings of observations.

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.

Stability and Change

- Things may change slowly or rapidly.
- Some things stay the same while other things change.

• Use observations to describe patterns and/or relationships in the natural and designed world to answer scientific questions and solve problems. **Obtaining, Evaluating, and Communicating Information** • Record observations, thoughts, ideas.	

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

EARTH AND SPACE SCIENCES: WEATHER & SEASONS

Students develop an understanding of patterns to understand changes in local weather and seasonal cycles.

Science Standard: K.E1U1.4 Observe, describe, ask questions, and predict seasonal weather patterns; and how those patterns impact plants and animals (including humans).

Learning Goals

I can:

- Make observations about seasonal weather patterns and their impact on plants and animals (including humans):
  - Take measurements of seasonal weather phenomena.
  - Record observations (*e.g., through pictures and/or words*).
  - Make inferences about seasonal weather patterns based on observations.
  - Make inferences about the impact of seasonal weather patterns based on observations.
- Ask questions:
  - Ask questions based on prior experiences with seasonal weather patterns.
  - Ask questions about the impact of seasonal weather patterns on plants and animals (including humans), based on prior experiences.
- Describe and predict seasonal weather patterns and their impact on plants and animals (including humans):
  - Describe seasonal weather patterns, using details from observations.
  - Describe how seasonal weather patterns affect plants and animals (including humans).
  - Predict future weather based on patterns of seasonal changes (*e.g., "The past two summers were really hot, so this summer will be, too."*).
  - Predict seasonal weather patterns based on conditions and movement of the air *(i.e., temperature, pressure, direction, and speed of movement; amount of water vapor in the air*).
  - Use prior experiences to predict how seasonal weather patterns will affect plants and animals (including humans).

Core Ideas

Knowing Science

E1: The composition of the earth and its atmosphere and the natural and human processes occurring within them shape the earth's surface and its climate.

- The temperature, pressure, direction, speed of movement and the amount of water vapor in the air combine to create the weather.
- Measuring these properties over time enables patterns to be found that can be used to predict the weather a short time ahead.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of weather patterns and their impact on plants and animals.
- Students make observations and collect data about seasonal weather phenomena and their impact on plants and animals.
- Students use the evidence from their observations to make inferences and predict future weather patterns and their impact on plants and animals.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world.	**Patterns**

Analyzing and Interpreting Data • Use and share pictures, drawings, and/or writings of observations. • Use observations to describe patterns and/or relationships in the natural and designed world to answer scientific questions and solve problems. **Obtaining, Evaluating, and Communicating Information** • Record observations, thoughts, ideas.	• Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. **Cause and Effect: Mechanism and Prediction** • Events have causes that generate observable patterns. **Stability and Change** • Things may change slowly or rapidly. • Some things stay the same while other things change.

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

EARTH AND SPACE SCIENCES: SUN, MOON, AND STARS

Students develop an understanding of patterns to understand changes in daylight.

Science Standard: K.E2U1.5 Observe and ask questions about patterns of the motion of the sun, moon, and stars in the sky.

Learning Goals

I can:

- Ask questions based on prior experiences with the Sun, Moon, stars, and planets.
- Make observations about the apparent motion of objects in the sky (*i.e., Sun, Moon, stars, planets*).
  - Identify the position(s) of objects in the sky.
  - Record observations (*e.g., through pictures and/or words*).
  - Make inferences about patterns of apparent motion of the Sun, Moon, and stars in the sky.
- Use data from observations to identify patterns in the apparent motion of objects in the sky (*e.g., using shadows at different times of day to identify patterns of movement of the sun, a sundial, a time lapse video, etc.*):
  - Compare the apparent position of objects over time.
  - Describe the apparent motion of the Sun, Moon, and stars over time.

Core Ideas

Knowing Science

E2: The earth and our solar system are a very small part of one of many galaxies within the universe.

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of the Sun, Moon, and stars.
- Students make observations about the apparent motion of the Sun, Moon, and stars in the sky.
- Students use the evidence from their observations to identify patterns and make sense of what is seen in the sky.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations of the natural and/or designed world.

Analyzing and Interpreting Data

- Use and share pictures, drawings, and/or writings of observations.
- Use observations to describe patterns and/or relationships in the natural and designed world to answer scientific questions and solve problems.

Obtaining, Evaluating, and Communicating Information

- Record observations, thoughts, ideas.

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.

Stability and Change

- Some things stay the same while other things change.

LIFE SCIENCE

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

LIFE SCIENCE: LIVING AND NON-LIVING THINGS

Students develop an understanding that the world is comprised of living and non-living things. They investigate the relationship between structure and function in living things; plants and animals use specialized parts to help them meet their needs and survive.

Science Standard: K.L1U1.6 **Obtain, evaluate, and communicate information about how organisms use different body parts for survival.**

Learning Goals

I can:

- Obtain and evaluate information (*e.g., from texts, media, demonstrations, and/or investigations*) about how organisms use different body parts for survival:
  - Ask questions about organisms' body parts to frame the search for information.
  - Use text features (*e.g., headings, tables of contents, glossaries, electronic menus, icons*) to obtain information.
  - Record information (*e.g., through pictures and/or words*) from texts and/or media.
  - Explain how visual images (*e.g., diagrams*) help clarify ideas in the text.
- Communicate (*e.g., through discussion, writing, and/or drawing*) how plants and animals use their external parts for survival:
  - Explain how plants have different parts (*i.e., roots, stems, leaves, flowers, fruits*) that help them survive, grow, and produce more plants.
  - Explain how animals have body parts (*i.e., eyes, ears, skin*) that capture and convey different kinds of information needed for growth and survival.
  - Explain how different organisms use their parts in different ways (*i.e. to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air*) in order to grow and survive.

Core Ideas

Knowing Science

L1: Organisms are organized on a cellular basis and have a finite life span.

- All organisms have various external parts used for survival.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of the Sun, Moon, and stars.
- Students make observations about how different organisms use their external parts for survival.
- Students use the evidence from their observations to explain how different body parts support organisms' survival.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations of the natural and/or designed world.

Obtaining, Evaluating, and Communicating Information

- Read and comprehend grade-appropriate texts and media to acquire scientific and/or technical information.
- Explain how specific images (e.g., diagrams) contribute to and clarify a text.

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

• Obtain information by using various text features (e.g., headings, tables of content, icons). • Record observations, thoughts, ideas.	

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

LIFE SCIENCE: LIVING AND NON-LIVING THINGS

Students develop an understanding that the world is comprised of living and non-living things. They investigate the relationship between structure and function in living things; plants and animals use specialized parts to help them meet their needs and survive.

Science Standard: K.L1U1.7 Observe, ask questions, and explain how specialized structures found on a variety of plants and animals (including humans) help them sense and respond to their environment.

Learning Goals

I can:

- Based on prior experiences, ask questions about how plants and animals use their body parts to sense and respond to their environment.
- Make direct or indirect observations about how plants and animals (including humans) use different parts of their body:
  - Identify structures of various plants and animals.
  - Identify the functions of various plant and animal structures.
  - Take measurements of specialized structures found on plants and animals.
  - Record observations (*e.g., through pictures and/or words*).
  - Make inferences about the relationship between plant and animal structures and their functions.
- Use evidence from observations to explain how animals (including humans) use their body parts (*i.e., eyes, ears, skin*) to help them sense their environment.
- Use evidence from observations to explain how plants use their body parts (*i.e., roots, stems, leaves*) to sense their environment.
- Use evidence from observations to explain how plants use their body parts to help them respond to their environment.
- Use evidence from observations to explain how animals (including humans) use their body parts to help them respond to their environment (*i.e., run from predator, seek shelter, find food*).

Core Ideas

Knowing Science

L1: Organisms are organized on a cellular basis and have a finite life span.

- Plants and animals have specialized parts that capture and convey different kinds of information needed for growth and survival. Plants and animals respond to these environmental inputs with behaviors that help them survive.
- Living things use their parts (structures) in different ways to help them sense, respond to, and survive in the world around them.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of plant and animal structures and their functions.
- Students make observations about how plants and animals use their structures to obtain information about and respond to their environment.
- Students use the evidence from their observations to make inferences about how specialized structures enable animals and plants to sense and respond to their environment.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world.	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their

Constructing Explanations and Designing Solutions • Use information from direct or indirect observations to construct explanations. **Obtaining, Evaluating, and Communicating Information** • Explain how specific images (e.g., diagrams) contribute to and clarify a text. • Record observations, thoughts, ideas.	function(s). **Systems and System Models** • Objects and organisms can be described in terms of their parts. • Systems in the natural and designed world have parts that work together.

CATALINA FOOTHILLS SCHOOL DISTRICT

KINDERGARTEN

LIFE SCIENCE: LIVING AND NON-LIVING THINGS

Students develop an understanding that the world is comprised of living and non-living things. They investigate the relationship between structure and function in living things; plants and animals use specialized parts to help them meet their needs and survive.

Science Standard: K.L2U1.8 **Observe, ask questions, and explain the differences between the characteristics of living and non-living things.**

Learning Goals

I can:

- Based on prior experiences, ask questions about living and non-living things.
- Make direct or indirect observations about living and non-living things:
  - Identify traits of living and non-living things.
  - Record observations (*e.g., through pictures and/or words*).
  - Make inferences about the characteristics of living and non-living things.
- List the characteristics of living things (*i.e., move, reproduce, react to stimuli*).
- Use evidence to explain how the characteristics of living things differ from the characteristics of non-living things.
- Classify things as living or non-living.

Core Ideas

Knowing Science

L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.

- There is a wide variety of living things (organisms), including plants and animals. They are distinguished from non-living things by their ability to move, reproduce, and react to certain stimuli.

Using Science

U1: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

- Students ask questions to frame their exploration of living and non-living things.
- Students make observations about living and non-living things.
- Students use the evidence from their observations to make inferences about the characteristics of living and non-living things.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations of the natural and/or designed world.

Constructing Explanations and Designing Solutions

- Use information from direct or indirect observations to construct explanations.
- Distinguish between opinions and evidence in one's own explanations.

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

Systems and System Models

- Objects and organisms can be described in terms of their parts.

COMPUTER SCIENCE

(Note: The Computer Science Standards will be taught by the STEM Integration Specialist in collaboration with the classroom teachers.)

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADES K-2

COMPUTER SCIENCE STANDARDS: COMPUTATIONAL THINKING

Concept: Computational Thinking (Algorithms and Programming)

Subconcepts:

- **Algorithms (A)**
- **Variables (V)**
- **Control (C)**
- **Modularity (M)**
- **Program Development (PD)**

Computer Science Standards:

K-2.AP.A.1 Model daily processes by following algorithms (sets of step-by-step instructions) to complete tasks.

Learning Goals

I can:

- Follow a set of step-by-step instructions written in pseudo code.
- Use a map to model a program's step by step instructions.

K-2.AP.V.1 Model the way computer programs use symbols (e.g. numbers, arrows, colors, pictographs) to represent information.

Learning Goals

I can:

- Use a set of command cards to create a logical sequence of actions.
- Read and act out a program constructed with command cards.

K-2.AP.C.1 Develop programs with sequences and simple loops, to express ideas or address a problem.

Learning Goals

I can:

- Plan and develop a three-command sequence to accomplish a programming goal.
- Use a loop to repeat steps in a program.

K-2.AP.M.1 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

Learning Goals

I can:

- Identify and count the steps required to accomplish a programming goal.
- Select and order the commands to accomplish the programming goal.
- Program a precise sequence of instructions to accomplish the programming goal.
- Use whole numbers and decimal fractions when inputting command values.

K-2.AP.PD.1 Develop plans that represent a program's sequence of events, goals, and expected outcomes (e.g. visual representation: storyboard, graphic organizer, map).

Learning Goals

I can:

- Use visual representations (i.e., organized lists, maps, and command cards) to make a plan to accomplish a task.

- Determine and record values needed for each command in the plan before programming and testing.

K-2.AP.PD.2 Give credit when using the ideas and creations (e.g. pictures, music, code) of others while developing programs.

Learning Goals

I can:

- Share ideas for programming solutions with others.
- Credit others when using their ideas and solutions.

Computer Science Practices

Fostering an Inclusive Computing Culture

- Build an inclusive and diverse computing culture using strategies that incorporate perspectives from people of different genders, ethnicities, and abilities.

Collaborating Around Computing

- Collaborate around computing by working in pairs and on teams to perform a computational task, asking for the contributions and feedback of others to improve outcomes.

Recognizing and Defining Computational Problems

- Recognize and define computational problems, break them down into parts, and evaluate each part to determine whether a computational solution is appropriate.

Developing and Using Abstractions

- Identify patterns and extract common features from specific examples to create generalizations from abstractions.

Creating Computational Artifacts

- Create computational artifacts that embrace both creative expression and the exploration of ideas to create prototypes and solve computational problems. Create artifacts that are personally relevant or beneficial to the community and beyond.

Testing and Refining Computational Artifacts

- Test and refine computational artifacts using a deliberate and iterative process for improving a computational artifact.

Communicating About Computing

- Communicate clearly with others about the use and effects of computation and computational choices, and to exchange ideas with others.

Science and Engineering Practices

Developing and Using Models

- Develop and/or use models (i.e., diagrams, drawings, physical replicas, dioramas, dramatizations, or storyboards) that represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world.

Constructing Explanations and Designing Solutions

- Use tools and materials provided to design a device or solution to a specific problem.

Planning and Carrying Out Investigations

- Make direct or indirect observations and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.

Obtaining, Evaluating, and Communicating Information

- Critique and/or communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers.

Crosscutting Concepts

Systems and System Models

- Objects and organisms can be described in terms of their parts.
- Systems in the natural and designed world have parts that work together.

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADES K-2

COMPUTER SCIENCE STANDARDS: DATA AND ANALYSIS

Concept: Data and Analysis

Subconcepts:

- **Collection, Visualization, and Transformation (CVT)**
- **Inference and Models (M)**

Computer Science Standards:

K-2.DA.CVT.1a Collect and transform data using a digital device.

Learning Goals

I can:

- Record data for a class data collection project using a digital device (i.e., digital camera, cell phone, iPad app, presentation software, spreadsheet).

K-2.DA.CVT.1b Display data for communication in various visual formats.

Learning Goals

I can:

- Generate a visual display of a class data set using a digital tool (i.e., slide show, video, animation).
- Generate a graph of a class data set using a digital tool (i.e., spreadsheet, presentation software, application).

K-2.DA.IM.1 Describe patterns in data to make inferences or predictions.

Learning Goals

I can:

- Identify a pattern in a displayed data set.
- Use a pattern to support an inference or prediction.
- Draw a conclusion from a collected and displayed data set.

Computer Science Practices

Fostering an Inclusive Computing Culture

- Build an inclusive and diverse computing culture using strategies that incorporate perspectives from people of different genders, ethnicities, and abilities.

Collaborating Around Computing

- Collaborate around computing by working in pairs and on teams to perform a computational task, asking for the contributions and feedback of others to improve outcomes.

Recognizing and Defining Computational Problems

- Recognize and define computational problems, break them down into parts, and evaluate each part to determine whether a computational solution is appropriate.

Developing and Using Abstractions

- Identify patterns and extract common features from specific examples to create generalizations from abstractions.

Creating Computational Artifacts

- Create computational artifacts that embrace both creative expression and the exploration of ideas to create prototypes and solve computational problems. Create artifacts that are personally relevant or beneficial to the community and beyond.

Testing and Refining Computational Artifacts

- Test and refine computational artifacts using a deliberate and iterative process for improving a computational artifact.

Communicating About Computing

- Communicate clearly with others about the use and effects of computation and computational choices, and to exchange ideas with others.

Science and Engineering Practices	Crosscutting Concepts
Planning and Carrying Out Investigations • Make direct or indirect observations and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal. **Analyzing and Interpreting Data** • Use and share pictures, drawings, and/or writings of observations. • Use observations to describe patterns and/or relationships in the natural and designed worlds in order to answer scientific questions and solve problems.	**Systems and System Models** • Objects and organisms can be described in terms of their parts. • Systems in the natural and designed world have parts that work together. **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s).