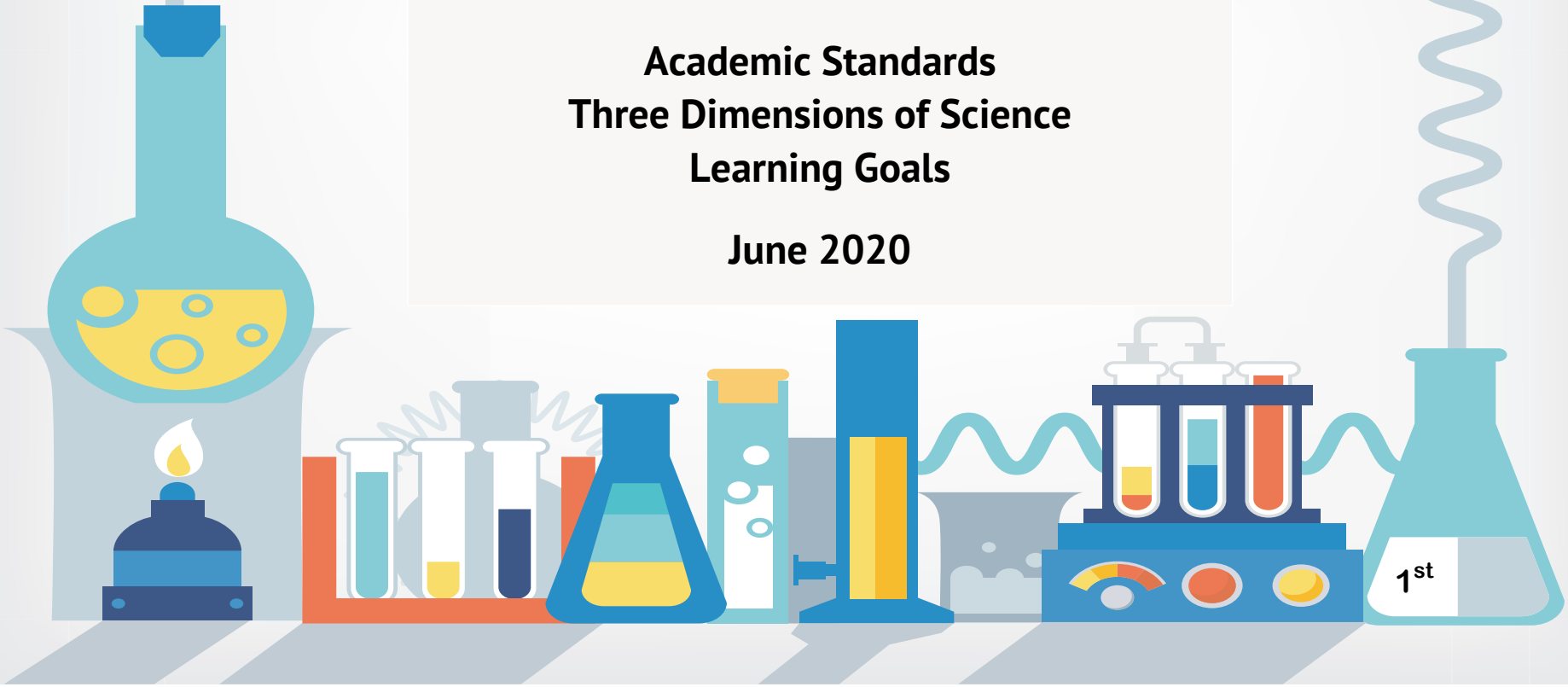
ENVISION 21

DEEP LEARNING • CFSD

SCIENCE

Academic Standards
Three Dimensions of Science
Learning Goals

June 2020



GRADE 1

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 OVERVIEW

By the end of first grade, students make observations to understand the connections between earth materials and the ability for Earth to sustain a variety of organisms. Students learn how objects can impact other objects from a distance or by contact with each other, how organisms interact with earth materials for survival, and how life systems have cycles. 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 first grade focus on helping students understand phenomena through the crosscutting concepts of *cause and effect* and *stability and change.*

The first grade 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 first grade 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	Light and Sound Waves	Students explore the relationships between sound and vibrating materials, as well as light and materials including the ability of sound and light to travel from place to place.
2	Physical Science	Forces and Interactions	Students develop an understanding of the effects of forces and waves, and how they can impact or be impacted by objects near and far away.
3	Earth and Space Sciences	Natural Resources	Students develop an understanding that earth materials are essential for organism's survival.
4	Life Science	Animals, Plants, and their Environments	Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.
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

GRADE 1 SCIENCE STANDARD

PHYSICAL SCIENCE: LIGHT AND SOUND WAVES

Students explore the relationships between sound and vibrating materials, as well as light and materials including the ability of sound and light to travel from place to place.

Science Standard: 1.P2U1.1 Plan and carry out investigations demonstrating the effect of placing objects made with different materials in the path of a beam of light and predict how objects with similar properties will affect the beam of light.

Learning Goals

I can:

- With guidance, design an investigation to test the effect of placing objects made with different materials in the path of a beam of light (*e.g., from the Sun, flashlight, lightbulb, candle, etc.*):
  - Ask a testable question about the effect of a beam of light on objects made with different materials (*e.g., mirror, prism, paper, glass, wood, etc.*).
  - Based on prior knowledge, formulate a prediction about the effect of a beam of light on objects made with different materials.
  - In collaboration with peers, design a procedure that will produce data in response to the testable question.
  - In collaboration with peers, determine how observations and/or measurements will be made in order to answer the testable question.
- In collaboration with peers, conduct simple investigations to test the effect of placing objects made with different materials in the path of a beam of light:
  - Follow a procedure with precision.
  - Make observations about the objects and the beam of light.
  - Collect data about the objects and the beam of light.
  - Use evidence from the investigation to make inferences about how and why different objects affect the beam of light.
  - Use an object's properties to make predictions about how an object will affect a beam of light (*i.e., some materials allow light to pass through them, others allow only some light through, others reflect light, and others still block all the light and create a dark shadow on any surface beyond them*).

Core Ideas

Knowing Science

P2: Objects can affect other objects at a distance.

- Light is a wavelike phenomenon that can travel across distances.

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 design and carry out investigations to obtain evidence about how different materials affect a beam of light. Students make observations during the investigation and form inferences from the evidence obtained in the investigation to make meaning of light phenomena.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world. **Planning and Carrying out Investigations** • With guidance, design and conduct investigations in collaboration with peers.	**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**

• Make direct or indirect observations and/or measurements to collect data, which can be used to make comparisons. • Identify questions and make predictions based on prior experience.	• Simple tests can be designed to gather evidence to support or refute student ideas about causes. • Events have causes that generate observable patterns.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

PHYSICAL SCIENCE: LIGHT AND SOUND WAVES

Students explore the relationships between sound and vibrating materials, as well as light and materials including the ability of sound and light to travel from place to place.

Science Standard: 1.P2U1.2 Use models to provide evidence that vibrating matter creates sound and sound can make matter vibrate.

Learning Goals

I can:

- Use evidence from models *(e.g., diagram, drawing, physical replica, diorama, dramatization, or storyboard)* to explain that sound creates vibration.
- Use evidence from models (*e.g., diagram, drawing, physical replica, diorama, dramatization, or storyboard*) to explain that vibrations can create sound.

Core Ideas

Knowing Science

P2: Objects can affect other objects at a distance.

- Sound is a wavelike phenomenon that can travel across distances.

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 use evidence from models to explain the relationship between sound and vibration.

Science and Engineering Practices

Developing and Using Models

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

Crosscutting Concepts

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.

Stability and Change

- Things may change slowly or rapidly.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

PHYSICAL SCIENCE: FORCES AND INTERACTIONS

Students develop an understanding of the effects of forces and waves, and how they can impact or be impacted by objects near and far away.

Science Standard: 1.P3U1.3 Plan and carry out investigations which demonstrate how equal forces can balance objects and how unequal forces can push, pull, or twist objects, making them change their speed, direction, or shape.

Learning Goals

I can:

- With guidance, design an investigation to test the effects of equal forces on objects (*i.e., balance*) and unequal forces on objects (*i.e., push, pull, or twist; making objects change speed, direction, or shape*):
  - Ask a testable question about the effects of forces on objects.
  - Based on prior knowledge, formulate a prediction about the effects of forces on objects.
  - In collaboration with peers, design a procedure that will produce data in response to the testable question.
  - In collaboration with peers, determine how observations and/or measurements will be made in order to answer the testable question.
- In collaboration with peers, conduct simple investigations to test the effects of equal forces on objects (*i.e., balance*) and unequal forces on objects (*i.e., push, pull, or twist; making objects change speed, direction, or shape*):
  - Follow a procedure with precision.
  - Make observations about the objects' motion.
  - Collect data about the effects of forces on objects.
  - Make inferences about how and why different forces affect objects.

Core Ideas

Knowing Science

P3: Changing the movement of an object requires a net force to be acting on it.

- Forces can push, pull or twist objects, making them change their motion or shape. Forces act in particular directions. Equal forces acting in opposite directions in the same line cancel each other and are described as being in balance. The movement of objects is changed if the forces acting on them are not in balance.

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 design and carry out investigations to obtain evidence about how different forces affect objects.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world. **Planning and Carrying out Investigations** • With guidance, design and conduct investigations in collaboration with peers.	**Cause and Effect: Mechanism and Prediction** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. • Events have causes that generate observable patterns. **Stability and Change**

• Make direct or indirect observations and/or measurements to collect data, which can be used to make comparisons. • Identify questions and make predictions based on prior experiences.	• Some things stay the same while others change.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

PHYSICAL SCIENCE: FORCES AND INTERACTIONS

Students develop an understanding of the effects of forces and waves, and how they can impact or be impacted by objects near and far away.

Science Standard: 1.P4U2.4 Design and evaluate ways to increase or reduce heat from friction between two objects.

Learning Goals

I can:

- Design ways to increase or reduce heat from friction between two objects (*e.g., by changing texture, amount of time, amount of pressure*):
  - Identify the design challenge.
  - Identify goals for the design.
  - Use tools and materials to develop multiple designs.
  - Communicate designs through sketches, drawings, or physical models.
- Evaluate the effectiveness of different designs:
  - Test multiple designs.
  - Make observations about the amount of heat produced through different designs.
  - Describe the strengths and weaknesses of the designs.
  - Compare two or more designs based on observations, strengths, and weaknesses.

Core Ideas

Knowing Science

P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event.

- When friction occurs, energy is transferred in the form of heat.
- There are ways to reduce the friction between two objects.

Using Science

U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.

- Students use 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 designs 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 and/or communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawing, writing, or numbers.

Crosscutting Concepts

Cause and Effect: Mechanism and Prediction

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Stability and Change

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

EARTH AND SPACE SCIENCES

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: NATURAL RESOURCES

Students develop an understanding that earth materials are essential for organisms' survival.

Science Standard: 1.E1U1.5 Obtain, evaluate, and communicate information about the properties of Earth materials and investigate how humans use natural resources in everyday life.

Learning Goals

I can:

- Obtain and evaluate information (*e.g., from demonstrations, investigations, texts, and/or media*) about the properties of Earth materials (*i.e., minerals, rocks, soil, water, wood*):
  - Ask questions about Earth materials and natural resources to frame the search for information.
  - Use text features (*e.g., headings, tables of contents, glossaries, electronic menus, icons*) to locate relevant information.
  - Record information (*e.g., through pictures and/or words*) from texts and/or media about the properties of Earth materials.
  - Explain how visual images (*e.g., diagrams*) help clarify ideas in the text.
  - Critique information (*e.g., peer explanations*) about the properties of Earth materials.
- Communicate (*e.g., through discussion, writing, and/or drawing*) about the properties of Earth materials:
  - Describe properties of rocks and minerals (luster, hardness, color).
  - Describe properties of soil.
  - Describe properties of water (odorless, colorless, tasteless).
- Investigate how humans use natural resources in everyday life:
  - Ask an investigative question about how humans use natural resources in everyday life.
  - Gather information from grade-level texts in response to the investigative question.

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.

- Wind and water can change the shape of the land. The resulting landforms, together with the materials on the land, provide homes for living things.
- Humans both shape and are shaped by the Earth's surface and climate.

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 obtain information from demonstrations, investigations, texts, and/or media to build their understanding of the properties of Earth's materials and the ways in which humans use natural resources.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world. **Obtaining, Evaluating, and Communicating Information**	**Cause and Effect: Mechanism and Prediction** • Events have causes that generate observable patterns. **Stability and Change**

• Read and comprehend grade-appropriate texts and media to acquire scientific and/or technical information. • Obtain information by using various text features (e.g., headings, tables of content, glossaries, electronic menus, icons). • Record observations, thoughts, ideas. • Explain how specific images (e.g., diagram) contribute to and clarify text.	• Some things stay the same while others change. • Things may change slowly or rapidly.

LIFE SCIENCE

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L1U1.6 Observe, describe, and predict life cycles of animals and plants.

Learning Goals

I can:

- Make direct and/or indirect observations about the life cycle of different plants (*e.g., from models, videos, diagrams, classroom gardens, live plants, etc.*).
- Use evidence from observations to describe the life cycle of different plants.
- Make direct and/or indirect observations about the life cycle of different animals (*e.g., from models, videos, diagrams, live animals, etc.*).
- Use evidence from observations to describe the life cycle of different animals.
- Use evidence from observations to make predictions about the life cycles of animals and plants.

Core Ideas

Knowing Science

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

- Every living thing has a life cycle. Living things have predictable characteristics at different stages of development.

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 obtain information from their observations of plant and animal life cycles.

Science and Engineering Practices

Constructing Explanations and Designing Solutions

- Use tools and materials provided to design a device or solution to a specific problem.
- Generate and compare multiple solutions to a problem.

Obtaining, Evaluating, and Communicating Information

- Read and comprehend grade-appropriate texts and media to acquire scientific and/or technical 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.

Stability and Change

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

Systems and System Models

- Systems in the natural and designed world have parts that work together.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L2U2.7 Develop and use models about how living things use resources to grow and survive; design and evaluate habitats for organisms using earth materials.

Learning Goals

I can:

- Develop and use models about how living things use resources to grow and survive:
  - Develop and make a simple model to show the relationship between living things and the resources in their environment (*e.g., in the form of a sketch, drawing, or physical model*).
  - Use models to explain how different parts of animals/plants allow them to survive in different habitats.
  - Use models to explain how plants and animals can depend on one another to survive.
  - Use models to explain how living things use resources to grow and survive.
  - Compare models to identify common features and differences.
- Design and evaluate habitats for organisms using earth materials:
  - Design habitats that meet the needs of the organisms that live there (*e.g., in the form of a sketch, drawing, model, diagram, diorama, dramatization, storyboard, physical replica*).
  - Test multiple designs (*e.g., using simulations or criteria*).
  - Describe the strengths and weaknesses of habitat designs.
  - Compare two or more habitat designs based on strengths and weaknesses.
  - Determine if a habitat design meets the needs of the organisms that live there.

Core Ideas

Knowing Science

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

- Plants and animals need resources to grow and survive. Habitats are made up of all of the living and non-living things organisms need to grow and survive.

Using Science

U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.

- Students use their understanding of the resources plants and animals need to survive in order to design and evaluate habitats that will meet their needs.

Science and Engineering Practices	Crosscutting Concepts
Developing and Using Models • Distinguish between a model and the actual object, process, and/or events the model represents. • Develop and/or use models that represent relationships and/or patterns in the natural and designed worlds.	**Cause and Effect: Mechanism and Prediction** • Events have causes that generate observable patterns. **Stability and Change** • Some things stay the same while others change.

• Compare models to identify common features and differences. **Constructing Explanations and Designing Solutions** • Use tools and materials provided to design a device or solution to a specific problem. • Generate and compare multiple solutions to a problem.	• Things may change slowly or rapidly. **Systems and System Models** • Systems in the natural and designed world have parts that work together.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L2U1.8 Construct an explanation describing how organisms obtain resources from the environment including materials that are used again by other organisms.

Learning Goals

I can:

- Use information from direct or indirect observations to explain how organisms obtain resources from the environment (*i.e., food, water, shelter, favorable temperature*):
  - Explain how animals use their senses to find food, water, and shelter.
  - Explain how animals use their body parts to gather, catch, eat, and chew their food.
  - Explain how plants use their body parts to obtain air, water, minerals, and sunlight.
- Use evidence to explain how animals and plants rely on each other and on Earth's materials to survive:
  - Explain how plants depend on animals (*i.e., for pollination or to move seeds around*).
  - Explain how herbivores and carnivores depend on plants (*i.e., to break down their food: herbivores eat plants directly and carnivores eat animals which have eaten plants or other animals*).

Core Ideas

Knowing Science

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

- Animals obtain resources from their surroundings, including food, water, shelter, and a favorable temperature. Different plants survive better in different settings because they have varied needs for water, minerals, and sunlight.
- Animals need food that they can break down, which comes either directly by eating plants (herbivores) or by eating animals (carnivores) which have eaten plants or other animals.

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 use evidence from observations to describe how organisms obtain and use resources.

Science and Engineering Practices	Crosscutting Concepts
Constructing Explanations and Designing Solutions • Use tools and materials provided to design a device or solution to a specific problem.	**Patterns** • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. **Energy and Matter: Flows, Cycles, and Conservation** • Energy can be transferred in various ways and between objects. **Cause and Effect: Mechanism and Prediction** • Events have causes that generate observable patterns.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L3U1.9 Obtain, evaluate, and communicate information to support an evidence-based explanation that plants and animals produce offspring of the same kind, but offspring are generally not identical to each other or their parents.

Learning Goals

I can:

- Obtain and evaluate information about how plant and animal offspring resemble, but are not identical to, their parents:
  - Ask questions about plant and animal offspring to frame the search for information.
  - Use text features (*e.g., headings, tables of contents, glossaries, electronic menus, icons*) to locate relevant 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.
  - Critique information (*e.g., peer evidence and explanations*) about plant and animal parents and their offspring.
- Communicate information (*e.g., through discussion, writing, and/or drawing*) to support an explanation of how plant and animal offspring resemble, but are not identical to, their parents:
  - Use evidence from observations and text to explain common characteristics among plants and animals of the same kind.
  - Use evidence from observations and text to explain ways in which offspring resemble and differ from their parents.
  - Use evidence from observations and text to explain how features can be similar from one generation to the next.
  - Develop explanations based on evidence rather than opinions.

Core Ideas

Knowing Science

L3: Genetic information is passed down from one generation of organisms to another.

- Young animals and plants are very much, but not exactly like, their parents. Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. Plants and animals, including humans, resemble their parents in many features because information is passed from one generation to the next.

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 use evidence obtained from texts, investigations, demonstrations, media, etc. to make sense of genetic phenomena.
- Students then construct explanations of the physical resemblance (or lack thereof) between plants and/or animals and their offspring.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world. **Obtaining, Evaluating, and Communicating Information**	**Patterns** • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

• Read and comprehend grade-appropriate texts and media to acquire scientific and/or technical information. • Record observations, thoughts, ideas. • Critique and/or communicate information with others in oral and/or written forms using models, drawings, writing, or numbers. • Obtain information by using various text features (e.g., headings, tables of content, glossaries, electronic menus, icons). • Explain how specific images (e.g., diagram) contribute to and clarify text. **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.	**Stability and Change** • Some things stay the same while others change. • Things may change slowly or rapidly. **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their functions.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 1 SCIENCE STANDARD

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L4U1.10 Develop a model to describe how animals and plants are classified into groups and subgroups according to their similarities.

Learning Goals

I can:

- Develop a sketch, drawing, or physical model to show how plants and animals are classified into groups and subgroups:
  - Create a model to classify animals and plants into groups based on similarities.
  - Create a model to classify animals and plants into subgroups based on more narrow similarities.
- Explain why a group of animals should or should not be grouped together based on similarities or differences.
  - Compare models to identify common features and differences.

Core Ideas

Knowing Science

L4: The unity and diversity of organisms, living and extinct, is the result of evolution.

- Animals and plants are classified into groups and subgroups according to their similarities.

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 models to describe the ways in which organisms are classified into groups and subgroups.

Science and Engineering Practices

Developing and Using Models

- Develop and/or use models that represent relationships and/or patterns in the natural and designed worlds.
- Compare models to identify common features and differences.

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 functions.

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GRADE 1 SCIENCE STANDARD

LIFE SCIENCE: ANIMALS, PLANTS, AND THEIR ENVIRONMENTS

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

Science Standard: 1.L4U3.11 Ask questions and explain how factors can cause species to go extinct.

Learning Goals

I can:

- Ask questions about factors that cause extinction.
- Base questions on direct or indirect observations of the natural world (*e.g., from text or media, visits to zoos or museums, etc.*).
- Use evidence to explain how factors (environmental or human impact) can cause species to go extinct.

Core Ideas

Knowing Science

L4: The unity and diversity of organisms, living and extinct, is the result of evolution.

- There are many different kinds of plants and animals in the world today and many kinds that once lived but are now extinct. These are evident from their fossils.
- Some kinds of plants and animals that once lived on Earth (e.g., dinosaurs) are no longer found anywhere, although others now living (e.g., lizards) resemble them in some ways.

Using Science

U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

- Different factors can cause species to go extinct. Conservation efforts for species protection often prompt ethical, social, economic, and political debate.

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' own explanation.

Crosscutting Concepts

Cause and Effect: Mechanism and Prediction

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Stability and Change

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

COMPUTER SCIENCE

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

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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.

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).

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.	

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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).