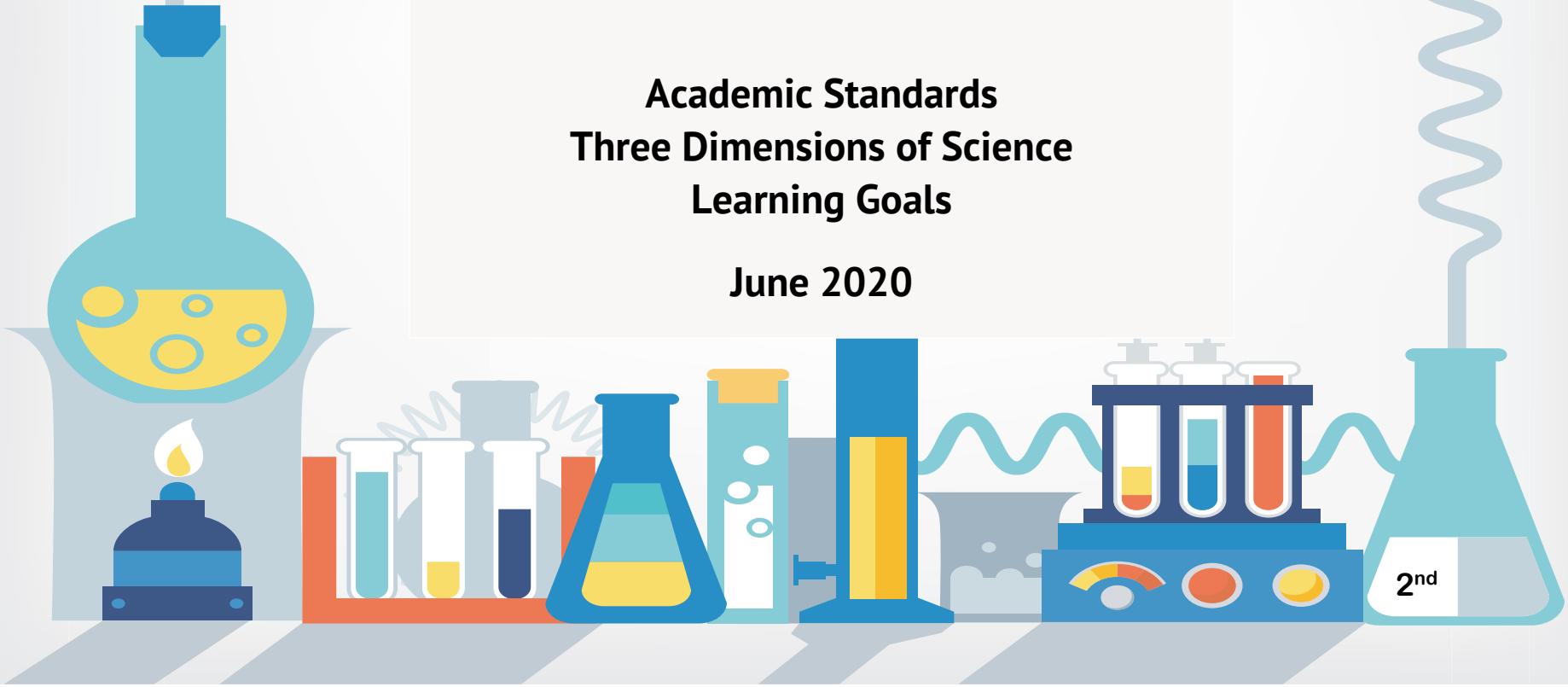
ENVISION 21

DEEP LEARNING • CFSD

SCIENCE

Academic Standards
Three Dimensions of Science
Learning Goals

June 2020



GRADE 2

GRADE 2 OVERVIEW

By the end of second grade, students understand the basic concept that energy can change the phase of matter and is necessary for life. Students begin to understand energy and matter, the formation of Earth's surface features, water cycles and energy flow, changes in the environment, patterns in the sky, and the conditions necessary for life on Earth. 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 second grade focus on helping students understand phenomena through the crosscutting concepts of *systems and system models* and *energy and matter*.

The second 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 second 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	Matter	Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials.
2	Earth and Space Sciences	Water, Wind, & Weather	Students develop an understanding of the distribution and role of water and wind in weather, shaping the land, and where organisms live. Wind and water can also change environments, and students learn humans and other organisms can change environments too.
3	Earth and Space Sciences	Sun, Moon, and Earth	Students develop an understanding of changing patterns in the sky including the position of Sun, Moon, and stars, and the apparent shape of the moon.
4	Life Science	Organisms and Energy	Students develop an understanding that life on Earth depends on energy from the Sun or energy from other organisms to 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

GRADE 2 SCIENCE STANDARD

PHYSICAL SCIENCE: MATTER

Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials.

Science Standard: 2.P1U1.1 Plan and carry out an investigation to determine that matter has mass, takes up space, and is recognized by its observable properties; use the collected evidence to develop and support an explanation.

Learning Goals

I can:

- With guidance, design an investigation to determine that matter has mass, takes up space, and is recognized by its observable properties:
  - Form testable questions about matter and its mass, and observable properties.
  - Based on prior knowledge, formulate a prediction in response to the testable question(s).
  - In collaboration with peers, design a procedure that will produce data in response to the testable question(s).
  - In collaboration with peers, determine how observations and/or measurements will be made in order to answer the investigative question.
- In collaboration with peers, conduct simple investigations to determine that matter has mass, takes up space, and is recognized by its observable properties:
  - Follow a procedure with precision.
  - Make observations about mass and the properties of matter.
  - Take measurements of phenomena related to mass and the properties of matter
  - Record data about mass and the properties of matter.
  - Use data from the investigation to make inferences about mass and the properties of matter.
- Develop and support an explanation:
  - Use evidence from the investigation to explain that matter has mass, takes up space, and is recognized by its observable properties.
  - Distinguish between opinions and evidence in own explanation.

Core Ideas

Knowing Science

P1: All matter in the Universe is made of very small particles.

- All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called matter because it has mass, and therefore weight on Earth, and takes up space. Different materials are recognizable by their properties, some of which are used to classify them as being in the solid, liquid or gas state.

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 an investigation to better understand matter and its properties. They use evidence obtained from their observations to construct an explanation about matter and its properties.

Science and Engineering Practices	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions based on observations of the natural and/or designed world.	**Energy and Matter: Flows, Cycles, and Conservation** • Objects may break into smaller pieces, be put together into larger pieces, or change

Planning and Carrying out Investigations • With guidance, design and conduct investigations in collaboration with peers. • Design and conduct investigations collaboratively. • Evaluate different ways of observing and/or measuring an attribute of interest. • Make direct or indirect observations and/or measurements to collect data, which can be used to make comparisons. **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.	shapes.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

PHYSICAL SCIENCE: MATTER

Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials.

Science Standard: 2.P1U1.2 Plan and carry out investigations to gather evidence to support an explanation on how heating or cooling can cause a phase change in matter.

Learning Goals

I can:

- With guidance, design an investigation to test how heating or cooling can cause a phase change in matter:
  - Form testable questions about the relationship between heating or cooling and the phases of matter.
  - Based on prior knowledge, formulate a prediction in response to the testable question(s).
  - In collaboration with peers, design a procedure that will produce data in response to the testable question(s).
  - In collaboration with peers, determine how observations and/or measurements will be made in order to answer the investigative question.
- In collaboration with peers, conduct simple investigations to test how heating or cooling can cause a phase change in matter:
  - Follow a procedure with precision.
  - Make observations about the impact of heating or cooling on the phases of matter.
  - Take measurements about the impact of heating or cooling on the phases of matter.
  - Record data about the impact of heating or cooling on the phases of matter.
  - Use data from the investigation to make inferences about the impact of heating or cooling on the phases of matter.
- Develop and support an explanation:
  - Use evidence from the investigation to explain how heating or cooling can cause a phase change in matter.
  - Distinguish between opinions and evidence in own explanation.

Core Ideas

Knowing Science

P1: All matter in the Universe is made of very small particles.

- Different kinds of matter exist (e.g., wood, metal, water), and many of them can be either solid or liquid, depending on temperature. Heating or cooling can cause a phase change in matter.

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 an investigation to better understand matter and its properties. They use evidence obtained from their observations to construct an explanation about matter and its properties.

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. • Design and conduct investigations collaboratively.	**Energy and Matter: Flows, Cycles, and Conservation** • Energy can be transferred in various ways and between objects. **Stability and Change** • Some things stay the same while other things change.

• Evaluate different ways of observing and/or measuring an attribute of interest. • Make direct or indirect observations and/or measurements to collect data, which can be used to make comparisons. **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.	• Things may change slowly or rapidly. **Cause and Effect: Mechanism and Prediction** • Events have causes that generate observable patterns. • Simple tests can be designed to gather evidence to support or refute student ideas about causes.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

PHYSICAL SCIENCE: MATTER

Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials.

Science Standard: 2.P4U1.3 Obtain, evaluate and communicate information about ways heat energy can cause change in objects or materials.

Learning Goals

I can:

- Obtain and evaluate information about ways heat energy can cause change in objects or materials (*i.e., cooking, melting solids, changing to vapor*):
  - Ask questions about heat energy to frame the collection of 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 ways heat energy can cause change in objects or materials.
  - Explain how visual images (*e.g., diagrams*) help clarify ideas in the text.
  - Critique information (*e.g., peer explanations*) about the ways heat energy can cause change in objects or materials.
- Communicate (*e.g., through discussion, writing, and/or drawing*) about the ways heat energy can cause change in objects or materials:
- Use evidence to describe the various ways heat energy can cause an event or bring about change in objects or materials (*i.e., cooking, melting solids, changing to vapor*).

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.

- Heating or cooling an object may cause observable changes. For example, in cooking, we can observe solids melting or water changing to vapor. Some of these changes are reversible, and some are not. Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.

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 evidence from scientific sources and use the evidence to develop and communicate their understanding of ways heat energy can cause change.

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

Crosscutting Concepts

Energy and Matter: Flows, Cycles, and Conservation

- Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.
- 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 other things change.

• Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. • Obtain information by using various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons).	• Things may change slowly or rapidly.

EARTH AND SPACE SCIENCES

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: WATER, WIND, AND WEATHER

Students develop an understanding of the distribution and role of water and wind in weather, shaping the land, and where organisms live. Wind and water can also change environments, and students learn humans and other organisms can change environments too.

Science Standard: 2.E1U1.4 Observe and investigate how wind and water change the shape of the land resulting in a variety of landforms.

Learning Goals

I can:

- Ask an investigative question about how wind and water change the shape of the land.
- Based on prior knowledge, formulate a prediction about how wind and water change the shape of the land.
- Based on prior knowledge, formulate a prediction about the formation of various landforms.
- Evaluate different ways of observing the phenomenon during the investigation.
- Make direct and/or indirect observations (*e.g., through experimentation, texts, media, demonstrations*) about how wind and water change the shape of the land.
- Make direct and/or indirect observations about the different landforms that wind and water create (*e.g., canyons, valleys, cliffs, arches, mesas, ravines, etc.*).
- Gather information from grade-level texts in response to the investigative question(s).
- Record data about how wind and water change the shape of the land.
- Use evidence to make inferences about how wind and water shape the land.
- Use evidence to make inferences about the formation of various landforms.

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.

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 from their investigation to develop their understanding of how wind and water shape the land.

Science and Engineering Practices

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.
- Design and conduct investigations collaboratively.
- Evaluate different ways of observing and/or measuring an attribute of interest.
- Make direct or indirect observations and/or measurements to collect data, which can be used to make comparisons.

Crosscutting Concepts

Stability and Change

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

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: WATER, WIND, AND WEATHER

Students develop an understanding of the distribution and role of water and wind in weather, shaping the land, and where organisms live. Wind and water can also change environments, and students learn humans and other organisms can change environments too.

Science Standard: 2.E1U1.5 Develop and use models to represent that water can exist in different states and is found in oceans, glaciers, lakes, rivers, ponds, and the atmosphere.

Learning Goals

I can:

- Develop models (*e.g., diagrams, drawings, physical replicas, dioramas, dramatizations, or storyboards*) to show that water exists in different states (*i.e., solid, liquid, vapor*).
- Develop models (*e.g., diagrams, drawings, physical replicas, dioramas, dramatizations, or storyboards*) to show the different locations where water is found (*i.e., oceans, glaciers, lakes, rivers, ponds, and the atmosphere*).
- Use models to explain the different states of water.
- Use models to explain the different locations where water is found.
- Compare models to identify common features and differences.

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.

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. It carries soil and rocks from one place to another and determines the variety of life forms that can live in a particular location.

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 create models based on evidence that water exists in different states and in different locations on Earth.

Science and Engineering Practices

Developing and Using Models

- Distinguish between a model and the actual object, process, and/or events the model represents.
- Compare models to identify common features and differences.
- 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 worlds.
- Develop a simple model that represents a proposed object or tool.

Constructing Explanations and Designing Solutions

- Use information from direct or indirect observations to construct explanations.

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.

Stability and Change

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

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: WATER, WIND, AND WEATHER

Students develop an understanding of the distribution and role of water and wind in weather, shaping the land, and where organisms live. Wind and water can also change environments, and students learn humans and other organisms can change environments too.

Science Standard: 2.E1U2.6 Analyze patterns in weather conditions of various regions of the world and design, test, and refine solutions to protect humans from severe weather conditions.

Learning Goals

I can:

- Analyze patterns in weather conditions of various regions of the world:
  - Ask questions about weather conditions to frame the analysis.
  - Make direct or indirect observations *(e.g., from texts, media, demonstrations, investigations*) of weather conditions.
  - Record observations in pictures, drawings, and/or writing.
  - Describe weather data from various regions of the world *(e.g., calculate quantities, create categories for data, compare data points, etc.).*
  - Use data from observations to identify patterns in weather conditions over time within and across various regions of the world.
  - Describe patterns in weather conditions over time and within and across various regions of the world.
- Design, test, and refine solutions to protect humans from severe weather conditions:
  - Use tools and materials to design solutions to protect humans from severe weather conditions.
  - Communicate designs through sketches, drawings, or physical models.
  - Test multiple designs *(e.g., using simulations or criteria)* to determine if it functions as intended.
  - Describe the strengths and weaknesses of different designs.
  - Compare two or more designs based on strengths and weaknesses.
  - Refine designs based on results of tests and comparisons.

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 the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

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 their analysis of weather patterns around the world to generate and test solutions to the problem of severe weather.

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 worlds in order to answer scientific questions and solve problems. • Make measurements of length to quantify data. • Analyze data from tests of an object or tool to determine if a proposed object or tool functions as intended. **Constructing Explanations and Designing Solutions** • Generate and compare multiple solutions to a problem.	• 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. • 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 other things change. • Things may change slowly or rapidly.

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: WATER, WIND, AND WEATHER

Students develop an understanding of the distribution and role of water and wind in weather, shaping the land, and where organisms live. Wind and water can also change environments, and students learn humans and other organisms can change environments too.

Science Standard: 2.E1U3.7 Construct an explanation from evidence regarding positive and negative changes in water and land systems that impact humans and the environment.

Learning Goals

I can:

- Use evidence (*e.g., from texts, media, investigations, demonstrations, observations, etc.*) to develop and support an opinion regarding positive and negative changes in water and land systems that impact humans and the environment:
  - State an opinion about the impact of changes in water and land systems on humans and the environment.
  - Use scientific evidence to support an opinion about positive and negative ways that water and land can change the environment.
  - Use scientific evidence to explain how changes in the shape of the land or flow of water can have a positive and/or negative impact on humans and the environment.

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 Plants and animals (including humans) depend on the land, water, and air to live and grow. They in turn can change their environment (e.g., the shape of land, the flow of water).

Using Science

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

- Arguments about interactions among humans, the environment, and Earth's systems are likely to involve ethical, social, economic, or political issues. Students will need to use scientific evidence to construct and support their arguments.

Science and Engineering Practices

Constructing Explanations and Designing Solutions

- Distinguish between opinions and evidence in one's own explanations.
- Generate and compare multiple solutions to a problem.

Crosscutting Concepts

Cause and Effect: Mechanism and Prediction

- Events have causes that generate observable patterns.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

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

GRADE 2 SCIENCE STANDARD

EARTH AND SPACE SCIENCES: SUN, MOON, AND EARTH

Students develop an understanding of changing patterns in the sky including the position of Sun, Moon, and stars, and the apparent shape of the moon.

Science Standard: 2.E2U1.8 Observe and explain the Sun's position at different times during a twenty-four-hour period and changes in the apparent shape of the Moon from one night to another.

Learning Goals

I can:

- Observe the Sun's position and the apparent shape of the Moon:
  - Make observations about the Sun's position at different times during a twenty-four hour period.
  - Make observations about apparent changes in the shape of the Moon from one night to another.
  - Record observations through pictures and/or words.
- Explain the sun's position and the apparent shape of the moon:
  - Use observations to explain the Sun's position at different times during a twenty-four hour period.
  - Use observations to explain apparent changes in the shape of the Moon from one night to another.

Core Ideas

Knowing Science

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

- There are patterns in the position of the Sun seen at different times of the day and in the shape of the Moon from one night to another.

Using Science

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

- Students make their own observations of the position of the Sun and the apparent shape of the Moon over time and they use their observations to describe the position of these bodies.

Science and Engineering Practices

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.

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.

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.

Stability and Change

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

LIFE SCIENCE

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

LIFE SCIENCE: ORGANISMS AND ENERGY

Students develop an understanding that life on Earth depends on energy from the Sun or energy from other organisms to survive.

Science Standard: 2.L2U1.9 Obtain, analyze, and communicate evidence that organisms need a source of energy, air, water, and certain temperature conditions to survive.

Learning Goals

I can:

- Obtain information about the survival needs of organisms (*i.e., a source of energy, air, water, and temperature conditions*):
  - Ask questions about the survival needs of organisms to frame the collection and analysis of evidence.
  - 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 survival needs of organisms.
  - Explain how visual images (*e.g., diagrams*) help clarify ideas in the text.
- Analyze information about the survival needs of organisms (*i.e., a source of energy, air, water, and temperature conditions*):
  - Use observations and evidence to describe what organisms need to survive.
  - Identify and explain patterns in the survival needs of organisms.
- Communicate (*e.g., through discussion, writing, and/or drawing*) about the survival needs of organisms (*i.e., a source of energy, air, water, and temperature conditions*):
  - Use evidence to explain the survival needs of organisms.

Core Ideas

Knowing Science

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

- All living things need food as their source of energy as well as air, water, and certain temperature conditions. Plants containing chlorophyll can use sunlight to make the food they need and can store food that they do not immediately use.

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 to make sense of the survival needs of organisms.

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 worlds in order to answer scientific questions and solve problems.

Obtaining, Evaluating, and Communicating Information

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

Crosscutting Concepts

Patterns

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

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.

Energy and Matter: Flows, Cycles, and Conservation

- Energy can be transferred in various ways and between objects.

technical information. • Critique and/or communicate information with others in oral and/or written forms using models, drawings, writing, or numbers. • Record observations, thoughts, and ideas. • Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. • Obtain information by using various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons).	

CATALINA FOOTHILLS SCHOOL DISTRICT

GRADE 2 SCIENCE STANDARD

LIFE SCIENCE: ORGANISMS AND ENERGY

Students develop an understanding that life on Earth depends on energy from the Sun or energy from other organisms to survive.

Science Standard: 2.L2U1.10 Develop a model representing how life on Earth depends on energy from the Sun and energy from other organisms.

Learning Goals

I can:

- Develop a simple model (*e.g., in the form of a picture, diagram, diorama, physical replica, dramatization or storyboard*) to show how life on Earth depends on energy:
  - Represent the Sun as an energy source.
  - Represent dependent relationships among plants and animals (*i.e., food web, food chain*).
  - Represent that plants make and store food (*i.e. plants with chlorophyll use sunlight to make food*).
  - Represent how animals obtain food from plants and/or other animals (*i.e., by directly eating plants and/or eating animals which have eaten plants*).
  - Compare models to identify common features and differences.

Core Ideas

Knowing Science

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

- The relationships among organisms can be represented as food chains and food webs. 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. Animals are ultimately dependent on plants for their survival. All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

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 models to develop their understanding of energy interdependencies for life on Earth.

Science and Engineering Practices

Developing and Using Models

- Distinguish between a model and the actual object, process, and/or events the model represents.
- Compare models to identify common features and differences.
- 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 worlds.
- Develop a simple model that represents a proposed object or tool.

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.

Energy and Matter: Flows, Cycles, and Conservation

- Energy can be transferred in various ways and between objects.

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).