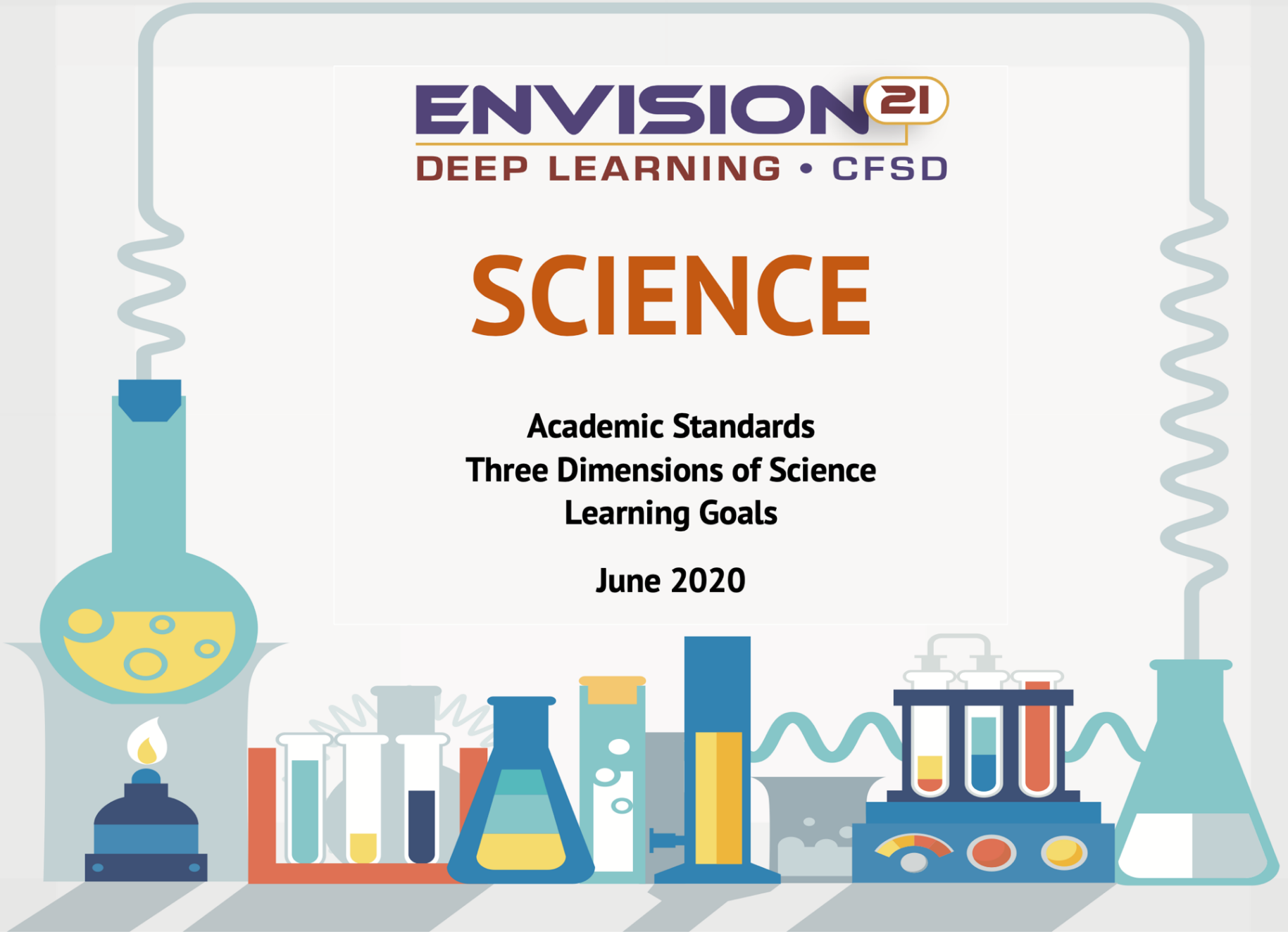
ENVISION 21

DEEP LEARNING • CFSD

SCIENCE

Academic Standards
Three Dimensions of Science
Learning Goals

June 2020



CATALINA FOOTHILLS SCHOOL DISTRICT
GRADE 2 SCIENCE STANDARDS

OVERVIEW

By the end of second grade, students learn about land and water systems, developing an understanding of states of matter in the context of Earth and its materials and exploring how Earth's landscape changes over time due to weather, wind, and water. Students examine how habitats support the needs of plants and animals and develop an understanding of diversity of life in local, land, and water habitats. 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*.

PHYSICAL SCIENCE

2.P1U1.1 Plan and carry out investigations to gather evidence to support an explanation on how heating or cooling can cause a phase change in matter.

- 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.

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

- 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*).

EARTH AND SPACE SCIENCES

2.E1U1.3 Observe and investigate how wind and water change the shape of the land resulting in a variety of landforms.

- 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.

2.E1U1.4 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.

- 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.

2.E1U2.5 Define problem(s) and design solution(s) to minimize the effects of natural hazards.

- Define the problem(s) presented by natural hazards:
  - Describe the problems presented by natural hazards.

    - Ask questions to clarify the constraints of solutions to a problem.
    - Define the design problem by establishing several criteria for success and constraints on materials, time, or cost.
- Design solution(s) to minimize the effects of natural hazards:
    - Use tools and materials to develop multiple designs that meet the established criteria and constraints.
    - Communicate designs through sketches, drawings, and/or physical models.
    - Apply scientific knowledge about weather and climate to design solution(s).
    - Generate and compare multiple solutions to the problem based on how well they meet the criteria and constraints of the problem.

2.E1U3.6 Construct an argument from evidence regarding positive and negative changes in water and land systems that impact humans and the environment.

- 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 a claim about the impact of changes in water and land systems on humans and the environment.
    - Use scientific evidence to support a claim 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.

2.E1U1.7 Obtain, evaluate, and communicate information about the properties of Earth materials and investigate how humans use natural resources in everyday life.

- 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.

LIFE SCIENCE

2.L2U2.8 Develop and use models about how living things use resources to grow and survive; design and evaluate habitats for organisms using earth materials.

- 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 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.

2.L2U1.9 Construct an argument from evidence that organisms are interdependent.

- State a claim about interdependencies among organisms.
- Select and explain scientific evidence (e.g., from texts, media, investigations, demonstrations, observations, etc.) to support claims about interdependencies among organisms.

COMPUTER SCIENCE: COMPUTATIONAL THINKING

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

- 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.

- 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.

- 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.

- 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).

- 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.

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

K-2.AP.PD.3 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

- Compare actual to intended programmed behavior.
- Identify the step(s) to correct when a programming goal is not accomplished.
- Correct commands for accuracy in accomplishing a programming goal.

K-2.AP.PD.4 Describe steps taken and choices made during program development.

- Discuss decisions with a partner throughout the process of planning, testing and refining a program.
- Reflect on the solutions to problems encountered and the number of trials needed to reach the programming goal.

COMPUTER SCIENCE: DATA AND ANALYSIS

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

- 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.

- 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.

- 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.