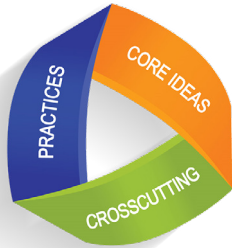


## THE THREE DIMENSIONS OF THE CA NGSS



### Dimension 1: Science and Engineering Practices (SEPs)

What scientists and engineers **do**. SEPs are skills and behaviors they use to answer a question or solve a problem.

### Dimension 2: Disciplinary Core Ideas

What scientists and engineers **know**. These fundamental ideas are organized into four disciplines: life science; physical science; Earth and space science; and engineering, technology, and applications of science.

### Dimension 3: Crosscutting Concepts

How scientists and engineers **think**. Understanding these common threads that tie together the four disciplines of science helps students deepen their understanding of core ideas and allows them to implement the practices more effectively.

### Combining the Three Dimensions

The CA NGSS define performance expectations (PEs) about what students should know and be able to demonstrate by the end of the school year. These PEs require students to use all three of the dimensions together.

### To help your student learn science:

- ▶ Talk with your student about the science you use and encounter every day.
- ▶ Observe and talk together about the weather, the phases of the moon, or how household gadgets work.
- ▶ Visit museums and hands-on science centers, plant a garden, and observe phenomena in your community. Participate in a creek, trail, or beach cleanup. Recycle at home and support your local electronic waste recycling.
- ▶ Talk with the teacher about the different phenomena your child will explore, and ask how you can support your student in engaging in the science and engineering practices at home.

### For more information on the CA NGSS and ideas for helping your student succeed, check out these resources:

- ▶ The California Next Generation Science Standards Web page is online at <https://www.cde.ca.gov/pd/ca/sc/ngssstandards.asp>.
- ▶ The 2016 Science Framework for California Public Schools is available online at <https://www.cde.ca.gov/ci/sc/cf/>.
- ▶ The Exploratorium is a hands-on museum in San Francisco. Its Web site at <http://www.exploratorium.edu/explore> includes engaging activities, videos, and links to topics such as Energy, Water, Food and Cooking, and Engineering and Tinkering.

Produced for the Consortium for the Implementation of the Common Core State Standards under the leadership of the Curriculum Frameworks and Instructional Resources Division of the California Department of Education and the Sacramento County Office of Education.



# What Your Student Will Learn: California Next Generation Science Standards

The goal of the California Next Generation Science Standards (CA NGSS) is to prepare California students to be informed citizens and future scientists. Students build science mastery through repeated learning experiences centered around everyday events in nature and their lives (“phenomena”). Focusing instruction around these observable phenomena allows students to understand how their world works and gives them the tools to solve problems they identify in it. Students shift from learning facts about science to actually engaging in the practices of science. *They learn how to be scientists!*

The CA NGSS divide science into four disciplines: life science, Earth and space science, physical science, and engineering. Students investigate phenomena from all four disciplines every year in elementary school.

## **Engineering, Technology, and Applications to Society**

This brochure highlights these embedded engineering connections with an asterisk (\*) in the grade level highlights below.

### **GRADE 3**

#### **Life Science**

What do plants and animals need to survive? Students collect evidence that forming groups and having lifecycle stages helps living things meet their needs.

How do living things depend on their environment? Students explain how certain traits allow organisms to survive in specific habitats but not in others. They analyze data about how traits are passed from parents to their offspring.

What happens to living things when their environment changes? Students evaluate different solutions to environmental problems and explore how these problems affect organisms.\*

#### **Earth and Space Science**

How do we describe the weather? Students research climates in different regions of the world. They use data to describe local weather conditions and notice how those conditions change.

Students identify weather-related hazards and engineer solutions to reduce their impact.\*

#### **Physical Science**

What affects the motion of an object? Students plan and conduct investigations about how objects move when they are pushed or pulled in different ways. They measure how objects move and recognize patterns to predict future movement. They ask questions about what causes magnetic or electrically charged objects to move when they interact with one another. They use their understanding of magnets to engineer solutions to an everyday problem.\*

### **GRADE 4**

#### **Life Science**

How does the structure of different body parts help creatures survive, grow, and reproduce? Students make a claim about how each structure has a specific function. Students develop models of how animals use their sense organs.

#### **Earth and Space Science**

How do different landscapes on Earth form and change? Students analyze and interpret maps of landscapes. They gather evidence from rock layers that wind, water, and living things sculpt and reshape the landscape.

#### **Physical Science**

How does energy affect the physical world? Students provide evidence that energy can be transferred from place to place by moving objects, sound, light, heat, or electricity.

How does energy affect the human world? Students develop a model of how light energy allows a person to see. They engineer different techniques to transfer information using patterns that can be transmitted using energy such as light or sound.\*

### **GRADE 5**

#### **Life Science**

How do organisms depend on one another? Students develop a model to describe “what eats what” and traces the flow of energy ultimately back to the Sun.

#### **Earth and Space Science**

What patterns can we observe by watching the Sun, Moon, and stars? Students analyze data from different seasons to reveal patterns.

How do people protect Earth’s resources and environment? Students develop a model of how different parts of Earth’s system interact, including the life, water, air, and solid Earth. They communicate strategies for protecting their planet and reducing human impacts on these different systems.\*

#### **Physical Science**

What causes materials to have different properties? Students identify materials based on their properties and conduct investigations to determine whether the mixing of two or more substances results in a new substance. They begin to explain these properties and behaviors using a model of matter made up of particles too small to be seen.