# Earth and Space Sciences—Grade Five

# Alternate Item Content Specifications

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## 4-ESS1-1 Earth’s Place in the Universe

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify patterns of fossils and rock formations that show how the Earth’s surface has changed over time. | 1. Ability to identify patterns of fossils and rock formations that show how the Earth’s surface has changed over time.
 | Match fossils with a landscape that has changed (e.g., marine fossils in an area previously covered by water). |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Identify evidence from patterns in rock formations and fossils in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.** [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] *[Assessment Boundary*: *Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]*

### Mastery Statements

Students will be able to:

Recognize that a fossil originated in a different type of landscape than where it was found

Identify how the Earth’s surface has changed using evidence of fossils

Identify how the Earth’s surface has changed using evidence of rock formations

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Marine fossils are found in rock layers in a rock outcrop, indicating that the area was once below sea level.
* A canyon has different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.
* Fossils of different types of plants and animals are found in different layers of an outcrop indicating changes in climate over time.

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 4-ESS1-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-4-ess1-1.docx>

Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

The *2016 Science Framework for California Public Schools Kindergarten through Grade Twelve* <https://www.cde.ca.gov/ci/sc/cf/cascienceframework2016.asp>

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade Twelve

<https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix1.pdf>

Appendix 2: Connections to Environmental Principles and Concepts

<https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix2.pdf>

## 4-ESS2-2 Earth’s Systems

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify patterns of Earth’s features on maps. | 1. Ability to identify patterns of Earth’s features by using maps.
 | Identify different land and water features by using a map. |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Analyze and interpret data from maps to describe patterns of Earth’s features.** [Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

### Mastery Statements

Students will be able to:

* Identify rivers, lakes, oceans, islands, mountains, and deserts on a map
* Identify simple patterns of Earth features on a map, including river tributaries forming larger rivers, chains of lakes, mountain chains, and volcano chains
* Identify patterns in the location of features including hot deserts, volcanoes, mountain chains, and rivers and identify a description of the location of one of these features

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

Identifying patterns in the location of geographical features on the continents:

* Location of mountain ranges
* Location of mountain ranges and volcanoes
* Location of deserts
* Location of rivers and lakes
* Phenomena of tributaries flowing together to form larger rivers

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 4-ESS2-2

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-4-ess2-2.docx>

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## 4-ESS3-2 Earth Processes and Human Activity

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify and compare human solutions to reduce the impact of a natural Earth process (e.g., earthquake, flood, volcanic activity) on humans. | 1. Ability to identify a human solution to reduce the impact of a natural Earth process on humans.
 | Recognize that different types of hazards result from natural Earth processes (e.g., earthquakes, volcanic eruptions). |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.** [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] *[Assessment Boundary*: *Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]*

### Mastery Statements

Students will be able to:

* Identify natural hazards when shown pictures or videos of natural hazards
* Identify human solutions for minimizing the impact of natural hazards
* Identify human solutions that increase the safety of individuals during natural hazard events

### Environmental Principles and Concepts

Principle 1—The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

Principle 2—The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Principle 4—The exchange of matter between natural systems and human societies affects the long-term functioning of both.

Principle 5—Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Earthquakes, with where and how to position oneself during an earthquake
* Floods, with planning ahead to leave and listening to news to know the risk
* Volcanic eruptions, with planning ahead to leave and listening to news to know the risk
* Changes in building designs to reduce the impacts of natural events

### Additional Assessment Boundaries

* Item scenarios should not depict extremely violent situations or human or animal injury.
* Item scenarios should not use the term tsunami. They may refer to flooding waves or ocean floods.

### Additional References

California Science Test Item Specification for 4-ESS3-2

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-4-ess3-2.docx>

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## 5-ESS1-2 Earth’s Place in the Universe

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Use data to describe similarities and differences in the timing of observable changes in shadows, daylight, and the appearance of stars. | 1. Ability to use data to describe similarities and differences in the timing of observable changes in shadows.
2. Ability to use data to describe similarities and differences in the timing of observable changes in daylight.
3. Ability to use data to describe similarities and differences in the timing of observable changes in the appearance of stars.
 | Recognize daily changes in the length and direction of shadows. |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.** [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the Sun and selected stars that are visible only in particular months.] *[Assessment Boundary*: *Assessment does not include causes of seasons.]*

### Mastery Statements

Students will be able to:

* Identify the change in appearance of a shadow based on changing locations of the Sun
* Identify the location of a shadow given the position of the Sun
* Recognize that stars appear differently in the sky depending on the season
* Recognize that stars appear to move across the sky throughout the night
* Identify the location of a shadow based on the relative time of day (morning, noon, evening)
* Recognize when shadows will be longer or shorter based on the time of day or location of the Sun
* Recognize that the amount of daylight changes as seasons change

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

Possible contexts include the following:

* The length of shadows throughout the day
* The pattern of the change in shadow length throughout the day
* The pattern of daylight (including number of hours) over the course of a year
* The path of the Sun across the sky as it rises and sets
* Stars in the sky that are viewable during some times of the year but not others
* The movement of shadows cast by an object and the movement of the Sun throughout the day

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 5-ESS1-2

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## 5-ESS2-1 Earth’s Systems

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify examples of ways the four major Earth systems interact to affect living things and the Earth’s surface materials and processes. | 1. Ability to identify examples of ways the four major Earth systems interact to affect living things and the Earth’s surface materials and processes.
 | Match a feature, material, or plant/animal to a sphere (e.g., plants [biosphere]; water [hydrosphere]; soil [geosphere]; release water vapor [atmosphere]). |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: The geosphere, hydrosphere (including ice), atmosphere, and biosphere are each a system and each system is a part of the whole Earth system. Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] *[Assessment Boundary*: *Assessment is limited to the interactions of two systems at a time.]*

### Mastery Statements

Students will be able to:

* Identify ways that two of Earth’s systems interact
* Identify examples of interactions of systems that affect living things or Earth’s materials
* Match one feature, material, or plant/animal to the sphere it occupies

### Environmental Principles and Concepts

Principle 1—The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

Principle 3—Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Effect of air on living things (necessary for survival)
* Effect of water on living things (necessary for survival)
* Effect of soil on plants, (e.g., soil provides plants in nature with minerals and a support for the roots)
* Effect of water on soil (erosion)
* Presence of water in air in the form of rain or snow
* Effect of animals on soil

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 5-ESS2-1

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## 5-ESS2-2 Earth’s Systems

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Recognize using data that the majority of water on Earth is found in the oceans as salt water and most of the Earth’s fresh water is stored in glaciers. | 1. Ability to recognize that the majority of water on Earth is found in the oceans as salt water.
2. Ability to recognize that most of the Earth’s fresh water is stored in glaciers.
 | Recognize where salt water and fresh water can be found on Earth. |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** [Clarification Statement: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

### Mastery Statements

Students will be able to:

* Recognize Earth has salt water and fresh water
* Identify places where fresh water or salt water is found on Earth
* Recognize that the majority of water on Earth is salt water found in the oceans
* Recognize that most of Earth’s fresh water is stored in glaciers

### Environmental Principles and Concepts

Principle 3—Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Pictures comparing the overall size of oceans to the size of lakes
* Graphs, charts or data tables comparing the amount of salt water and freshwater in different reservoirs
* Graphs, charts or data tables comparing the amount of freshwater in different reservoirs
* Pictures comparing different sources of water for drinking and growing plants

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 5-ESS2-2

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-5-ess2-2.docx>

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## 5-ESS3-1 Earth and Human Activity

| **California Science Connector** | **Focal Knowledge, Skills, and Abilities** | **Essential Understanding** |
| --- | --- | --- |
| Using provided information, identify ways people can help protect the Earth’s resources and how that affects the environment. | 1. Ability to use information to identify ways people can help protect the Earth’s resources and how that affects the environment.
 | Identify a way a community could protect a natural resource (e.g., reusing paper, recycling cans and bottles). |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.**

### Mastery Statements

Students will be able to:

* Identify environmentally friendly behaviors
* Identify how environmentally friendly behaviors by people help the environment
* Use information such as simple graphs, charts, or data tables to identify ways that people can protect their environment

### Environmental Principles and Concepts

Principle 2—The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Principle 4—The exchange of matter between natural systems and human societies affects the long-term functioning of both.

Principle 5—Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Practices for reducing or mitigating the effects of air and water pollution (e.g., riding a bicycle instead of driving a car, not pouring used oil on the ground)
* Practices for preventing soil erosion (e.g., planting grass to cover bare areas, using mulch to reduce runoff from planting beds)
* Practices for reducing or mitigating the effects of habitat destruction (e.g., planting trees, providing bird houses, making a butterfly garden at school
* Recycling

### Additional Assessment Boundaries

* Contexts should not include acid precipitation, invasive species, and environmental regulation.

### Additional References

California Science Test Item Specification for 5-ESS3-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-5-ess3-1.docx>

Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

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*Posted by the California Department of Education, August 2020*