

5-ESS2-1 Earth's Systems

California Science Test—Item Content Specifications

# 5-ESS2-1 Earth's Systems

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.*]

Continue to the next page for the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Developing and Using Models  Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.  Develop a model using an example to describe a scientific principle. | ESS2.A: Earth Materials and Systems   1. Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. | Systems and System Models  A system can be described in terms of its components and their interactions. |

## Assessment Targets

Assessment targets describe the focal knowledge, skills, and abilities for a given three-dimensional Performance Expectation. Please refer to the Introduction for a complete description of assessment targets.

### Science and Engineering Subpractice(s)

Please refer to appendix A for a complete list of Science and Engineering Practices (SEP) subpractices. Note that the list in this section is not exhaustive.

2.1 Ability to develop models

### Science and Engineering Subpractice Assessment Targets

Please refer to appendix A for a complete list of SEP subpractice assessment targets. Note that the list in this section is not exhaustive.

2.1.1 Ability to determine components of a scientific event, system, or design solution

2.1.2 Ability to determine the relationships among multiple components of a scientific event, system, or design solution

2.1.4 Ability to represent mechanisms, relationships, and connections to illustrate, explain or predict a scientific event

### Disciplinary Core Idea Assessment Targets

#### ESS2.A.3

* Identify Earth’s major systems as the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans)
* Describe how any two of Earth’s systems interact to affect Earth’s surface
* Identify a model showing how two of Earth’s systems interact
* Interpret a model showing how two of Earth’s systems interact in a specific event

### Crosscutting Concept Assessment Target(s)

CCC4 Describe a system in terms of its components and their interactions

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a scenario of an event:

* Identifies the two systems contributing most to the event (2.1.1, ESS2.A.3, and CCC4)
* Creates a model showing how the two systems are involved in the event (2.1.3, ESS2.A.3, and CCC4)

Task provides an incomplete model relevant to an event:

* Completes the model by incorporating relevant components (2.1.1, ESS2.A.3, and CCC4)
* Identifies the interactions (2.1.1, ESS2.A.3, and CCC4)
* Describes the interactions that led to the event (2.1.3, ESS2.A.3, and CCC4)

## California Environmental Principles and Concepts

* EP3: 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.

* Effect of water on the geosphere (e.g., beach deposition and erosion, river channel erosion, and deposition)
* Effect of glaciers on the land and ocean
* Effect of plants on the geosphere (e.g., roots breaking rocks, reducing erosion, decaying leaves changing the composition of soil)
* Effect of large volcanic eruptions on the atmosphere

## Common Misconceptions

Note that the list in this section is not exhaustive.

* There has been life on Earth since its formation.
* The Earth does not change.
* Hydrosphere includes only liquid water.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

5-ESS2-1 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/5-ESS2-1 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/5-ESS2-1%20Evidence%20Statements%20June%202015%20asterisks.pdf)

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

California Education and the Environment Initiative <http://californiaeei.org/>

The *2016 Science Framework for California Public Schools Kindergarten through Grade 12*

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade 12 <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>

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