

HS-ESS2-2 Earth’s Systems

California Alternate Assessment for Science—Item Content Specifications

# HS-ESS2-2 Earth’s Systems

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
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| Identify relationships, using a model, of how the Earth’s surface is a complex and dynamic set of interconnected systems (e.g., geosphere, hydrosphere, atmosphere, biosphere). | 1. Ability to identify relationships, using a model, of how Earth’s surface is a complex and dynamic set of interconnected systems. | Recognize that climate change occurs when the Earth’s systems are changed. |

## **CA NGSS Performance Expectation**

Students who demonstrate understanding can:

**Analyze geoscience data to make the claim that one change to Earth’s surface can create feedbacks that cause changes to other Earth systems.** [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth’s surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

## Mastery Statements

Students will be able to:

* Recognize an effect on climate resulting from a change in an Earth system
* Identify how a change in one system can affect another system
* Identify how a change in one system caused an effect in a different system

## California Environmental Principles and Concepts

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

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

## Possible Phenomena or Contexts

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

**Possible contexts include the following:**

* Clouds, volcanic eruptions, precipitation, or ice in climate change
* Greenhouse gas effect on global temperature and ice caps
* The effect on the upstream environment (hydrosphere and biosphere) from damming a river
* The effect on the environment (hydrosphere, geosphere, and biosphere) of removing plants and leaving bare soil
* The effect on the atmosphere of removing plants and leaving bare soil
* The effect on the environment (hydrosphere, geosphere, and biosphere) of an overpopulation of herbivores

## Additional Assessment Boundaries

* None listed at this time

## Additional References

California Science Test Item Specification for HS-ESS2-2

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

California 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>

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