

California Alternate Assessment for Science—Item Content Specifications

# HS-ESS2-3 Earth’s Systems

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
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| Use a model of Earth to identify the motion of the mantle and its plates occurs primarily through thermal convection, which is primarily driven by radioactive decay within Earth’s interior. | 1. Ability to use a model to identify that the motions of the mantle and its plates occur primarily through thermal convection.
2. Ability to identify Earth’s core as the primary source of the heat that drives mantle convection by using a model.
 | Use a model of Earth to identify the inner core, the outer core, the mantle, and the crust. |

## **CA NGSS Performance Expectation**

Students who demonstrate understanding can:

**Develop a model based on evidence of Earth’s interior to describe the cycling of matter by thermal convection.** [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth’s three-dimensional structure obtained from seismic waves, records of the rate of change of Earth’s magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth’s layers from high-pressure laboratory experiments.]

## Mastery Statements

Students will be able to:

* Identify the inner core of Earth
* Identify the outer core of Earth
* Identify the mantle of Earth
* Identify the crust of Earth
* Identify thermal convection as the cause of the movement of tectonic plates
* Recognize Earth’s core is the primary source of heat that drives mantle convection

## Possible Phenomena or Contexts

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

**Possible contexts include the following:**

* Models of the layers of Earth
* The direction of convection currents in the mantle and the relative direction of plate movements
* The direction of the flow of material (thermal convection) in Earth’s mantle
* Relationship of thermal convection to heat in Earth’s core
* Effect of thermal convection on Earth’s surface and interior

## Additional Assessment Boundaries

* None listed at this time

## Additional References

California Science Test Item Specification for HS-ESS2-3

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-hs-ess2-3.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>

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