

MS-ESS2-3 Earth's Systems

California Science Test—Item Content Specifications

# MS-ESS2-3 Earth's Systems

Students who demonstrate understanding can:

Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

[Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [*Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.*]

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 |
| --- | --- | --- |
| Analyzing and Interpreting Data  Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.  Analyze and interpret data to provide evidence for phenomena.  Connections to Nature of Science  Scientific Knowledge is Open to Revision in Light of New Evidence  Science findings are frequently revised and/or reinterpreted based on new evidence. | ESS1.C: The History of Planet Earth   1. Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. *(HS.ESS1.C GBE), (secondary to MS-ESS2-3)*   ESS2.B: Plate Tectonics and Large-Scale System Interactions   1. Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart. | Patterns  Patterns in rates of change and other numerical relationships can provide information about natural systems. |

## Assessment Targets

Assessment targets describe the focal knowledge, skills, and abilities for a given three-dimensional Performance Expectation. Please refer to the Introduction (hyperlink to section on explanation of assessment targets) 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.

4.1 Ability to record and organize data

4.2 Ability to analyze data to identify relationships

### 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.

4.1.3 Ability to organize data in a way that facilitates analysis and interpretation

4.2.1 Ability to use empirical data to describe patterns and relationships

4.2.2 Ability to identify patterns (qualitative or quantitative) among variables represented in data

4.2.4 Ability to consider limitations of data analysis (e.g., measurement error, sample selection)

### Disciplinary Core Idea Assessment Targets

#### ESS1.C.3

* Locate mid-ocean ridges and trenches along plate boundaries
* Describe the evidence that supports the claim that mid-ocean ridges are sources of oceanic crusts
* Describe the evidence that supports the claim that ocean trenches are sinks of oceanic crusts
* Identify patterns in the age of the seafloor, which increases from a ridge or the center of an ocean to the edges of the ocean or a trench

#### ESS2.B.3

* Describe that distributions of certain similar fossils and rocks on widely separated continents are evidence of past plate motions
* Describe that complementary shapes of widely separated continents are evidence of past plate motions
* Describe that the pattern of the ages of the seafloor are evidence of past plate motions

### Crosscutting Concept Assessment Target(s)

CCC1 Identify that patterns in rates of change and other numerical relationships can provide information about natural systems

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides data that can be used as evidence of past plate motions:

* Organizes the information and data to identify a coherent pattern in the data (4.1.3, ESS2.B.3, and CCC1)
* Interprets organized (either pre-organized data or organized by the student in an earlier task) to describe a coherent pattern regarding the data and plate movement (4.1.3, ESS2.B.3, and CCC1)

Task provides quantitative or qualitative data that can be used as evidence of past plate motions:

* Describes a pattern or relationship among variables in the data set (4.2.1, ESS1.C.3, and CCC1)

Task provides background information and a data display (e.g., map or diagram) that provides evidence of past plate motions:

* Identifies patterns or relationships in the data that can act as evidence of the past plate motions described in the background information (4.2.2, ESS2.B.3, and CCC1)

Task provides a data set that is limited in its ability to answer a particular scientific question regarding past tectonic plate motion:

* Explains why the data set is limited in supporting an analysis of past plate motions (4.2.4, ESS2.B.3, and CCC1)
* Identifies a new source of evidence that could supplement the provided data in answering the question (4.2.4, ESS2.B.3, and CCC1)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Maps or tables of the locations of similar fossils or rocks on different continents
* Maps showing the coastline and outlines of the continental shelves
* Maps, diagrams, or tables showing the locations of mid-ocean ridges and trenches and ages of the seafloor
* Comparing the ages of rocks from the seafloor crust and from continental crust
* Evidence of possible ancient plate tectonic boundaries (e.g., within the Appalachian Mountains) on continents

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Only continents move.
* The edges of continents are plate boundaries.
* The seafloor is all the same age.
* Earth is not a dynamic system.
* Convergent plate boundaries always result in subduction.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

MS-ESS2-3 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/MS-ESS2-3 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/MS-ESS2-3%20Evidence%20Statements%20June%202015%20asterisks.pdf)

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>

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