

3-LS4-1 Biological Evolution: Unity and Diversity

California Science Test—Item Content Specifications

# 3-LS4-1 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

[Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [*Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.*]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Analyzing and Interpreting DataAnalyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.Analyze and interpret data to make sense of phenomena using logical reasoning. | LS4.A: Evidence of Common Ancestry and Diversity1. Some kinds of plants and animals that once lived on Earth are no longer found anywhere. *(Note: moved from K-2)*

Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. | Scale, Proportion, and QuantityObservable phenomena exist from very short to very long time periods.Connections to Nature of ScienceScientific Knowledge Assumes an Order and Consistency in Natural SystemsScience assumes consistent patterns in 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 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.

4.2 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.

4.2.1 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

#### LS4.A.1

* Identify that fossils represent organisms that lived long ago
* Identify that some fossils represent organisms that lived long ago, but the lineages became extinct and have no modern counterparts

#### LS4.A.2

* Describe the relationships among fossils of organisms that lived long ago and their modern counterparts
* Describe the relationships between types of fossils and the environments where their modern counterparts are found
* Describe the relationships between the fossils of organisms and the environments in which the ancient organisms lived
* Describe the relationships among fossils of organisms, the environments in which the ancient organisms lived, and the current environments where the fossils are found

### Crosscutting Concept Assessment Target(s)

CCC3 Identify phenomena that represent time periods from the very short to the very long

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides data about fossils of organisms whose lineages have become extinct:

* Provide evidence for the extinction of the lineages (4.2.1, LS4.A.1, and CCC3)

Task provides data about fossils of an extinct organism and its modern counterpart:

* Describes similarities and differences between the fossil organism and the modern counterpart (4.2.1, LS4.A.2, and CCC3)

Task provides data about fossils that are found in seemingly unexpected environments, based on the type of fossilized organism:

* Identifies the relationship between the types of fossils and the environments in which the fossilized organisms lived, and by extension, how environments on Earth have evolved over time (4.2.2, LS4.A.2, and CCC3)

Task provides data about the distribution of similar fossils; the fossils in one location support an evolutionary lineage that leads to extant organisms, but the fossils in another location support an extinction of the lineage:

* Identifies the factor, such as a change in the environment, that might have caused one lineage to flourish, while the other lineage became extinct (4.2.2, LS4.A.2, and CCC3)

Task provides a data set with fossil evidence such as bones:

* Identifies limitations of the evidence, such as the inability of the fossils to characterize certain details of the organism’s appearance or physiology (4.2.4, LS4.2, and CCC3)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Fossils of extinct organisms that are no longer present today
* Fossils of organisms that have modern counterparts
* Substrates in which fossils are found
* Fossils found in unexpected places (e.g., reptile or plant fossils found in polar environments)

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Except for periodic mass extinction events, extinction is very rare.
* Most of the species of organisms that lived in the past are still present today.
* All species appeared at the same time and still exist today.
* Environmental conditions have stayed largely the same throughout the history of the earth.
* Environmental conditions have changed in the past but are no longer changing.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

[3-LS4-1 Evidence Statement](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS4-1%20Evidence%20Statements%20June%202015%20asterisks.pdf) <https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS4-1%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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