

MS-LS4-2 Biological Evolution: Unity and Diversity

California Science Test—Item Content Specifications

# MS-LS4-2 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

[Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Constructing Explanations and Designing SolutionsConstructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. | LS4.A: Evidence of Common Ancestry and Diversity4. Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. | PatternsPatterns can be used to identify cause and effect relationships.Connections to Nature of ScienceScientific Knowledge Assumes an Order and Consistency in Natural SystemsScience assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. |

## 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.

6.1 Ability to construct explanations of phenomena

### 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.

6.1.1 Ability to construct quantitative and/or qualitative explanations of observed relationships based on valid and reliable evidence

6.1.2 Ability to apply scientific concepts, principles, theories, and big ideas to construct an explanation of a real-world phenomenon

6.1.3 Ability to use models and representations in scientific explanations

### Disciplinary Core Idea Assessment Targets

#### LS4.A.4

* Articulate a statement about the similarities and differences, and the evolutionary relationships among modern organisms and between fossil organisms and modern organisms
* Identify and/or describe evidence of similarities and differences in anatomical patterns in modern living organisms and between modern living organisms and fossilized organisms
* Use reasoning to connect evidence to a claim that organisms are more likely to be closely related if they share a pattern of similar anatomical features due to the cause-and-effect relationship between genetic makeup and anatomy
* Use reasoning to connect evidence to a claim that living organisms can be linked to extinct organisms that share basic anatomical features by observing changes over time in anatomical features in the fossil record and that evolutionary descent of organisms can be inferred from these changes

### Crosscutting Concept Assessment Target(s)

CCC1 Use patterns to identify cause-and-effect relationships

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a data set comparing selected anatomical features of modern organisms:

* Articulates a conclusion about the evolutionary relationships among the organisms (6.1.1, LS4.A.4, and CCC1)
* Identifies or describes evidence of similarities and differences in anatomical patterns that support a conclusion (6.1.1, LS4.A.4, and CCC1)
* Uses reasoning to connect evidence to a conclusion (6.1.1, LS4.A.4, and CCC1)

Task provides a data set comparing selected anatomical features of modern and extinct organisms:

* Articulates a conclusion about the evolutionary relationships among the organisms (6.1.1, LS4.A.4, and CCC1)
* Identifies or describes evidence of similarities and differences in anatomical patterns that support a conclusion (6.1.1, LS4.A.4, and CCC1)
* Uses reasoning to connect evidence to a conclusion (6.1.1, LS4.A.4, and CCC1)

Task provides evidence that the anatomical features of both modern and extinct organisms indicate an evolutionary relationship:

* Uses reasoning to connect evidence to a statement about the similarities and differences in anatomical patterns in fossilized organisms and/or modern living organisms (6.1.2, LS4.A.4, and CCC1)
* Uses reasoning to connect evidence to a statement about the similarities and differences in anatomical patterns between modern living organisms and fossilized organisms (6.1.2, LS4.A.4, and CCC1)

Task provides representations of selected anatomical features of modern and extinct organisms:

* Identifies or describes evidence of similarities and differences in anatomical patterns that support a conclusion about evolutionary relationships (6.1.3, LS4.A.4, and CCC1)

## California Environmental Principles and Concepts

* EP2: The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Comparison of homologous, analogous, or vestigial structures
* Adaptations for aquatic or terrestrial life
* Trends in complexity over geologic time
* Comparison of extant vs. extinct fossils
* Interpolating gaps in the fossil record

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Species that are similar can share a common ancestor, but species that have no apparent, obvious, or superficial similarities cannot share a common ancestor.
* Plants and animals cannot share a common ancestor.
* Humans do not share a common ancestor with other living organisms.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

MS-LS4-2 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/MS-LS4-2 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/MS-LS4-2%20Evidence%20Statements%20June%202015%20asterisks.pdf)

California 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 California Environmental Principles and Concepts <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix2.pdf>

Posted by the California Department of Education, March 2021 (updated February 2024)