

3-LS4-4 Biological Evolution: Unity and Diversity

California Science Test—Item Content Specifications

# 3-LS4-4 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

[Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [*Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.*]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Engaging in Argument from Evidence  Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).  Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. | LS2.C: Ecosystem Dynamics, Functioning, and Resilience  1. When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.*(secondary to 3-LS4-4)*  LS4.D: Biodiversity and Humans  2. Populations live in a variety of habitats, and change in those habitats affects the organisms living there. | Systems and System Models  A system can be described in terms of its components and their interactions.  Connections to Engineering, Technology, and Applications of Science  Interdependence of Engineering, Technology, and Science on Society and the Natural World  Knowledge of relevant scientific concepts and research findings is important in engineering. |

## 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.

7.2 Ability to compare, evaluate and critique competing arguments

### 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.

7.2.1 Ability to evaluate arguments about a natural phenomenon based on scientific concepts, principles, and big ideas

7.2.3 Ability to evaluate competing perspectives/claims using reasoning and evidence

### Disciplinary Core Idea Assessment Targets

#### LS2.C.1

* Identify changes in a place’s environment that can cause problems for the existing plants and animals living within that area
* Recognize how changes in a given environment can allow some organisms to survive and reproduce better than others
* Recognize how changes in a given environment can cause some organisms to move to new locations
* Recognize how changes in a given environment can cause some new organisms to move into the transformed environment
* Recognize how changes in a given environment can cause some organisms to die

#### LS4.D.2

* Describe how changes in a habitat can affect the organisms living there
* Observe the effects of a solution to a change in a habitat on the organisms living there
* Predict the effects of a solution to a change in habitat on the organisms living there

### Crosscutting Concept Assessment Target(s)

CCC4 Describe a system in terms of its components and their interactions

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides several proposed solutions to an identified environmental problem that impacts the plants and animals along with arguments about why they would work:

* Evaluates which of the provided arguments are scientific arguments (7.2.1, LS2.C.1, and CCC4)

Task provides a proposed solution to an identified environmental problem that impacts the plants and animals along with several arguments about why it would work:

* Evaluates the weaknesses and strengths of the provided arguments (7.2.1, LS2.C.1, and CCC4)

Task provides several proposed, competing solutions to an identified environmental problem that impacts the plants and animals:

* Evaluates the competing solutions and selects the most appropriate one(s) given certain criteria and constraints (7.2.1, LS2.C.1, and CCC4)

Task provides a proposed solution to an identified environmental problem that impacts the plants and animals:

* Describes possible evidence and reasoning that can be used to explain what makes it a good solution (7.2.3, LS2.C.1, and CCC4)
* Describes possible evidence and reasoning that can be used to explain why it is not a good solution (7.2.3, LS2.C.1, and CCC4)

## 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.

* Changes in physical characteristics of an environment resulting from natural disasters or human construction (e.g., light from beach houses interfering with turtle hatchlings)
* The availability of resources, such as food, water, and sunlight
* The ability to interact with the rest of the population in the area
* The introduction of a new competitive, invasive species (e.g., mussels, cheatgrass)
* The loss of a keystone species

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Scientific evidence and reasoning cannot predict the most appropriate solutions.
* Environmental changes can always be reversed.
* Environmental changes are always completely positive or completely negative.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

3-LS4-4 Evidence Statement <https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS4-4%20Evidence%20Statements%20June%202015%20asterisks.pdf>

[Environmental Principles and Concepts](http://californiaeei.org/abouteei/epc/) <http://californiaeei.org/abouteei/epc/>

[California Education and the Environment Initiative](http://californiaeei.org/) [http://californiaeei.org/](http://californiaeei.org/" \o "California Education and the Environment Initiative web page)

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

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