

3-LS4-2 Biological Evolution: Unity and Diversity

California Science Test—Item Content Specifications

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

Students who demonstrate understanding can:

Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

[Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Constructing Explanations and Designing Solutions  Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.  Use evidence (e.g., observations, patterns) to construct an explanation. | LS4.B: Natural Selection  1. Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. | Cause and Effect  Cause and effect relationships are routinely identified and used to explain change. |

## 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.B.1

* Identify that variations in characteristics exist between individuals of the same species
* Identify that individuals of a species with a beneficial variation of a trait may have an advantage over other individuals for survival
* Identify that individuals of a species with a beneficial variation of a trait may have a reproductive advantage

### Crosscutting Concept Assessment Target(s)

CCC2 Identify cause and effect relationships, using them to explain change

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a data set or graphical display showing character variation in a species/population:

* Constructs an explanation based on the data about character variation within the group (6.1.1, LS4.B.1, and CCC2)
* Describes an advantage that character variation may confer on an individual and/or a species (6.1.2, LS4.B.1, and CCC2)

Task provides a model of character variation in a species/population:

* Uses a model or representation to explain the advantages/disadvantages of variation on individual survival and reproduction (6.1.3, LS4.B.1, and CCC2)
* Uses a model or representation to explain the cause-and-effect relationship between the variation and the environment (6.1.3, LS4.B.1, and CCC2)

## 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.

* Within a species, there is variation in characteristics or traits (e.g., coloration patterns in moths or salamanders).
* Some variants are better suited to a given environment and increase the likelihood of an individual’s survival and opportunity to reproduce (e.g., seasonal changes in Arctic hare fur color, camouflage that helps protect organisms from predators).
* Variation can be genetic or environmental but must be genetic to be inherited.
* A change in environment can lead to a change in which variants are better suited to survive and reproduce.

## Common Misconceptions

Note that the list in this section is not exhaustive.

* New traits arise because they are required for survival.
* Sudden environmental change is required for evolution.
* New traits are always beneficial to an organism.
* Only beneficial traits are passed on.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

3-LS4-2 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/3-LS4-2 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS4-2%20Evidence%20Statements%20June%202015%20asterisks.pdf)

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

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