

3-LS3-1 Heredity: Inheritance and Variation of Traits

California Science Test—Item Content Specifications

# 3-LS3-1 Heredity: Inheritance and Variation of Traits

Students who demonstrate understanding can:

Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

[Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [*Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples*.]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Analyzing and Interpreting Data  Analyzing 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. | LS3.A: Inheritance of Traits  2. Many characteristics of organisms are inherited from their parents.  LS3.B: Variation of Traits  2. Different organisms vary in how they look and function because they have different inherited information. | Patterns  Similarities and differences in patterns can be used to sort and classify natural phenomena. |

## 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.

4.1 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.

4.1.1 Ability to record information and represent data in tables and graphical displays

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

4.2.3 Ability to apply concepts of statistics and probability to data

### Disciplinary Core Idea Assessment Targets

#### LS3.A.2

* Identify that similarities in traits exist between parents and offspring in plant and animal species
* Identify that similarities in traits exist among siblings
* Recognize that many characteristics are inherited from parents.
* Describe that patterns in traits shared between offspring and their parents, or among siblings, provide evidence that traits are inherited

#### LS3.B.2

* Identify that differences in traits exist between parents and offspring
* Identify that differences in traits exist between siblings
* Explain that different organisms vary in how they look and function because they have inherited different information
* Explain that patterns of differences in traits between offspring and their parents, or among siblings, provide evidence that inherited traits can vary

### Crosscutting Concept Assessment Target(s)

CCC1 Use similarities and differences in patterns to sort and classify designed products

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides data on variation of a trait among offspring from a set of parents:

* Presents the data graphically (4.1.1, LS3.A.2, and CCC1)
* Interprets the range of variation among the offspring (4.2.1, LS3.B.2, and CCC1)
* Identifies the patterns/relationships in the variation between parents and the offspring (4.2.2, LS3.B.2, and CCC1)

Task provides a scenario showing several sets of parents and their offspring in a given population:

* Presents the data graphically (4.1.1, LS3.B.2, and CCC1)
* Identifies patterns in the data and can describe relationships between individuals (4.1.1, LS3.B.2, and CCC1)
* Determines the range of variation for a particular trait (4.2.3, LS3.B.2, and CCC1)
* Predicts traits in offspring between two individuals in the population (4.2.3, LS3.B.2, and CCC1)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Traits are inherited from the parents (e.g., fur color patterns, plant height, flower color).
* Some traits show minor variation from parents to offspring; others show wide variation.
* Different genetic information in individuals in a species accounts for different traits shown in organisms.
* Siblings have different combinations of genetic information from the same parents, leading to differences in observable traits.

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Only beneficial traits are passed on from the parents.
* New traits arise only out of need.
* Offspring are always a combination of both parents; traits of the offspring are a range of traits from both parents.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

[3-LS3-1 Evidence Statement](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS3-1%20Evidence%20Statements%20June%202015%20asterisks.pdf) <https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-LS3-1%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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