

MS-LS4-3 Biological Evolution: Unity and Diversity

California Science Test—Item Content Specifications

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

Students who demonstrate understanding can:

Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

[Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [*Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.*]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Analyzing and Interpreting Data  Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.  Analyze displays of data to identify linear and nonlinear relationships. | LS4.A: Evidence of Common Ancestry and Diversity  5. Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy. | Patterns  Graphs, charts, and images can be used to identify patterns in data. |

## 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

### Disciplinary Core Idea Assessment Targets

#### LS4.A.5

* Identify linear and nonlinear relationships including patterns of similarities in embryos across species by using organized pictorial displays
* Identify linear and nonlinear relationships including patterns of changes as embryos develop by using organized pictorial displays
* Describe evidence of relatedness among apparently diverse species using patterns of changes and similarities in embryo development shown in organized pictorial displays

### Crosscutting Concept Assessment Target(s)

CCC1 Use graphs, charts, and images to identify patterns in data

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides images or text descriptions of different organisms during progressive stages of embryonic development:

* Describes phylogenetic relationships among the organisms based on analyzing the pictorial displays or descriptions provided (4.2.1, LS4.A.5, and CCC1)
* Identifies developmental patterns or phylogenetic relationships among the organisms based on analyzing the pictorial displays or descriptions provided (4.2.2, LS4.A.5, and CCC1)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Appearance of the embryos of diverse vertebrate species during progression through early stages of development
* Features present during early stages of vertebrate embryonic development that are lacking in many of the species as adults
* Comparison of embryo and juvenile development in different invertebrate marine phyla
* Developmental patterns of species undergoing metamorphosis

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Embryos of different species always look very different.
* Embryos of a single species look the same at every stage.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

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