# Life Sciences—Grade Five

# Alternate Item Content Specifications

**Prepared for the California Department of Education by Educational Testing Service**



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## 3-LS1-1 From Molecules to Organisms: Structures and Processes

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify a common pattern between models of different life cycles.  | 1. Ability to identify a common pattern between models of different life cycles (e.g., birth, growth, reproduction, death).
 | Identify a life cycle stage that all organisms have in common (e.g., birth, growth, death).  |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** [Clarification Statement: Changes organisms go through during their life form a pattern.] *[Assessment Boundary*: *Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]*

### Mastery Statements

Students will be able to:

* Recognize a life cycle stage that all organisms have in common when shown pictures of the stages
* Recognize a common stage in the life cycle of two of the same type of organism when shown pictures of the life cycles
* Identify two life cycles that have similar patterns
* Complete a life cycle diagram when provided a completed diagram of a similar cycle
* Identify similar life cycles among different types of organisms

### Environmental Principles and Concepts

Principle 3—Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Life cycles of common mammals, including humans, that include birth, growth (may include juvenile stage), and adulthood
* Life cycles of reptiles and amphibians that include eggs, birth, growth (may include juvenile stage), and adulthood
* Life cycles of common and familiar insects (e.g. butterflies and bees) that include eggs, larva, pupa, and adulthood
* Life cycles of plants that include seeds, seedlings, and adult flowering plants

### Additional Assessment Boundaries

* Life cycles should be circular, with the life beginning on the left side.
* When the terms larva(e) and pupa(e) are used, they should only function as labels for stages. Students should not be required to know what those terms mean. Stages may also be referred to as beginning, middle, and end, or may be numbered.

### Additional References

California Science Test Item Specification for 3-LS1-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-3-ls1-1.docx>

Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

The *2016 Science Framework for California Public Schools Kindergarten through Grade Twelve* <https://www.cde.ca.gov/ci/sc/cf/cascienceframework2016.asp>

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade Twelve

<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>

3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Recognize that animals within a group help the group obtain food for survival, defend themselves, and survive changes in their ecosystem.  | 1. Ability to recognize that animals within a group help the group obtain food for survival.
2. Ability to recognize that animals within a group help the group defend themselves.
3. Ability to recognize that animals within a group help the group survive changes in their ecosystem.
 | Recognize that some animals form groups to survive.  |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Construct an argument that some animals form groups that help members survive.**

### Mastery Statements

Students will be able to:

* Recognize that animals in a group work together to find food
* Recognize how one animal’s behavior helps the entire group find food
* Recognize how one animal’s behavior helps the entire group protect themselves from other animals
* Recognize how animals work together to survive changes in the environment

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Colonizing insects, such as bees and ants
* Penguins grouping together for warmth
* Herbivores watching for danger and issuing a warning
* Dolphins herding fish into a group to catch them
* Beavers building dams
* Birds building a group nest

### Additional Assessment Boundaries

* Avoid depictions of violent scenes.
* Avoid predator/prey relationships (hunting in groups).

### Additional References

California Science Test Item Specification for 3-LS2-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-3-ls2-1.docx>

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

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Based on data through observation, identify similarities in the traits of a parent and the traits of an offspring and variations in similar traits in a grouping of similar organisms.  | 1. Ability to identify similarities in the traits of a parent and the traits of an offspring (e.g., tall plants typically have tall offspring).
 | Identify variations in similar traits in a grouping of similar organisms (e.g., dogs come in many shapes and sizes, siblings look alike and different).  |

### CA NGSS Performance Expectation

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.]*

### Mastery Statements

Students will be able to:

* Identify probable offspring from two parents based on physical traits
* Identify the two parents of an offspring based on physical traits
* Select a physical trait that is similar between an offspring and its parents
* Identify an animal that has a trait different from that of a sibling

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Offspring may have obvious traits from both parents.
* Siblings may not look like one another.
* Individuals of the same species may look different from one another.

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 3-LS3-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-3-ls3-1.docx>

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

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Using evidence, through observation, identify features and characteristics that enable an organism to survive in a particular environment.  | 1. Ability to identify features and characteristics that enable an organism to survive in a particular environment using evidence through observation.
 | Match characteristics of a plant or animal to their survival function (e.g., thorns on a plant, camouflage of an animal).  |

### CA NGSS Performance Expectation

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 produce offspring.]

### Mastery Statements

Students will be able to:

* Match a characteristic or feature of an organism to its role in supporting the survival of the organism
* Identify a single feature or characteristic of an organism that would help it survive in a specific environment
* Identify how a feature or characteristic would help an organism survive in a specific environment
* Identify two features or characteristics of an organism that would help it survive in a specific environment

### Environmental Principles and Concepts

Principle 2—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 or prescriptive.*

**Possible contexts include the following:**

* Desert environment—cacti, animals that go underground during the day, animals that need very little water, animals that are active at night
* Arctic environment—animals with thick fur, animals with white coloration, animals that hibernate, plants that grow and reproduce very quickly
* Water environment—animals with webbed feet or fins, plants with leaves that float on the surface (water lilies)

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 3-LS4-2

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-3-ls4-2.docx>

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## 4-LS1-1 From Molecules to Organisms: Structures and Processes

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Match internal and external structures of plants and animals (e.g., thorns, stems, roots, heart, stomach, lung, brain) to functions that support growth, survival, behavior, and reproduction of organisms.  | 1. Ability to match external structures of a plant to functions that support growth, reproduction or survival of organisms.
2. Ability to match internal structures of an animal to functions that support growth, survival or behavior of organisms.
3. Ability to match external structures of an animal to functions that support growth, survival or behavior of organisms.
 | Match an external structure of an animal to its primary function (body parts; fingers to grasp, nose to smell/breathe).  |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] *[Assessment Boundary*: *Assessment is limited to macroscopic structures within plant and animal systems.]*

### Mastery Statements

Students will be able to:

* Match a common external animal structure to its primary function
* Match an internal structure of an animal to its primary function in survival, growth, or behavior
* Match an external structure of an animal to its primary function in survival, growth, or behavior
* Identify how the function of an external structure of an animal supports survival, growth, or behavior
* Match an external structure of a plant to its primary function in survival, growth, or reproduction
* Identify how the function of an external structure of a plant supports survival, growth, or reproduction

### Environmental Principles and Concepts

Principle 2—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 or prescriptive.*

**Possible contexts include the following:**

* Plant structures including roots to absorb water, stems to support plants, leaves to make food, thorns and spines for protections, and flowers for reproduction
* External animal structures including webbed feet for swimming, thick fur for warmth, camouflage for protection, shape for running or swimming fast, large ears for hearing, etc.
* Internal animal structures including heart, stomach, lungs, and brain

### Additional Assessment Boundaries

* Internal organs are limited to the heart, stomach, lungs, and brain.

### Additional References

California Science Test Item Specification for 4-LS1-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-4-ls1-1.docx>

Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

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## 5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
| --- | --- | --- |
| Identify a model that shows the movement of matter (e.g., plant growth, eating, composting) through living things.  | 1. Ability to identify a model that shows the movement of matter (e.g., plant growth, eating, composting) through living things.
 | Identify that an animal needs the plant in a food chain or food web and that the food chain or food web has two main parts: producer and consumer.  |

### CA NGSS Performance Expectation

Students who demonstrate understanding can:

**Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.** [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] *[Assessment Boundary*: *Assessment does not include molecular explanations.]*

### Mastery Statements

Students will be able to:

* Identify which common animal consumes another in a food chain or food web
* Identify a plant or an animal that is consumed by an animal in a food chain or food web
* Identify the order in which a plant and an animal should be placed in a food chain
* Identify the direction matter flows in a simple matter pyramid
* Recognize that water, air, and light are needed for plant growth
* Identify the location of decomposers in a food chain, food web, or matter pyramid

### Environmental Principles and Concepts

Principle 3—Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

Principle 4—The exchange of matter between natural systems and human societies affects the long-term functioning of both.

### Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Pictures showing interactions of common plants and animals in ecosystems
* Food web interactions showing the interactions of common plants and animals
* Food pyramids depicting common plants and animals and highlighting the change in biomass as energy and materials move up the pyramid

### Additional Assessment Boundaries

* None listed at this time

### Additional References

California Science Test Item Specification for 5-LS2-1

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-5-ls2-1.docx>

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