CALIFORNIA

Assessment of Student Performance and Progress


California Assessment of
Student Performance and Progress

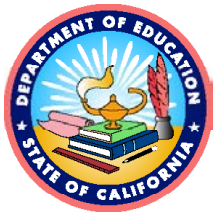
# California Science Test

## Training Items Scoring Guide

# Grade Five

2018–19 Administration


*Measuring the Power of Learning.™*

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# Introduction to Training Test Answer Guide

This California Science Test (CAST) training items scoring guide offers details about the items, student response types, correct responses, and related scoring considerations for the included samples of training items. These items have been selected to show some of the new approaches to measuring the California Next Generation Science Standards (CA NGSS) that can be found in the assessment. The training test items are not fully representative of all possible item types included in the CAST, but additional samples will be provided over time. The samples cover a selection of items from performance expectations in grade five.

The following information is presented along with each item:

**Performance Expectations (PE) Code**: References the assessable evidence statements of what students should know and be able to do.

**Science and Engineering Practices (SEP)**: Descriptions of behaviors that scientists and engineers engage in as they investigate the natural world and design solutions, respectively.

**Disciplinary Core Ideas (DCI):** Essential ideas in the science disciplines that all students should understand.

**Crosscutting Concepts (CCC)**: Interdisciplinary skills that unify the study of science and engineering through common application across fields.

**Depth of Knowledge (DOK):** A measure of complexity that considers the students' cognitive process in response to an item (There are four DOK levels, with 4 being the highest.)

**Item-Level Claim Statement (ILCS)**: A brief statement that illustrates how an item aligns to the PE through at least two of the dimensions (An ILCS is included with each item to help item reviewers (1) identify the intent of the alignment, (2) determine if the alignment is appropriate and valid, and (3) identify the content reflected in item-level specifications.)

**Item and Stimulus**: Item represents the question being asked, while stimulus is supporting information, graphics, animation or simulation included with some items.

**Answer Key**: The expected student response or example response including score point value.

**Rubric and Exemplar**: Rubric explains what is needed for each score point. Exemplars give a sample response from a student.

While each item is aligned to a specific PE through its dimensions, certain items, based on their contexts, incorporate aspects of environmental literacy outlined in the Environmental Principles and Concepts adopted by the State Board of Education in 2004. The items in this training test are not fully representative of the full range of ways items can incorporate environmental literacy.

The training test items will include numbered instructional text preceding the first item.

Each item that follows has metadata as shown. Metadata contains the specific information on the alignment of the item to the NGSS standards. The item number in the table preceding each sample item corresponds to the sequence number of the item as it appears in the training test.

### Example of Metadata

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 2 | 5 | 5-PS1-2 | 5. Using mathematics and computational thinking | PS1.A Structure and Properties of Matter | 3 Scale, proportion and quantity | 3 |

**ILCS:** Complete a bar graph to identify the weight of water before and after melting.

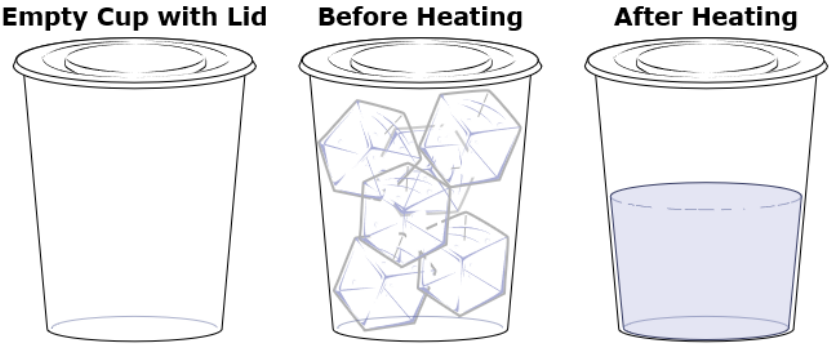
# Grade Five Sample Items

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 2 | 5 | 5-PS1-2 | 5. Using mathematics and computational thinking | PS1.A Structure and Properties of Matter | 3 Scale, proportion and quantity | 3 |

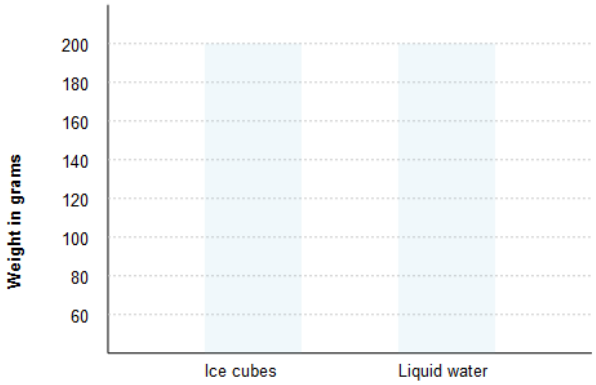
**ILCS:** Complete a bar graph to identify the weight of water before and after melting.

**98**

A student filled a plastic cup with ice cubes and placed a lid on the cup. The empty cup with the lid weighed 20 grams. The cup with the lid and the ice cubes weighed 180 grams. The student used a hair dryer to gently heat the ice cubes. After all the ice melted, the student weighed the cup with the lid and the liquid water. The diagram shows the changes that took place.

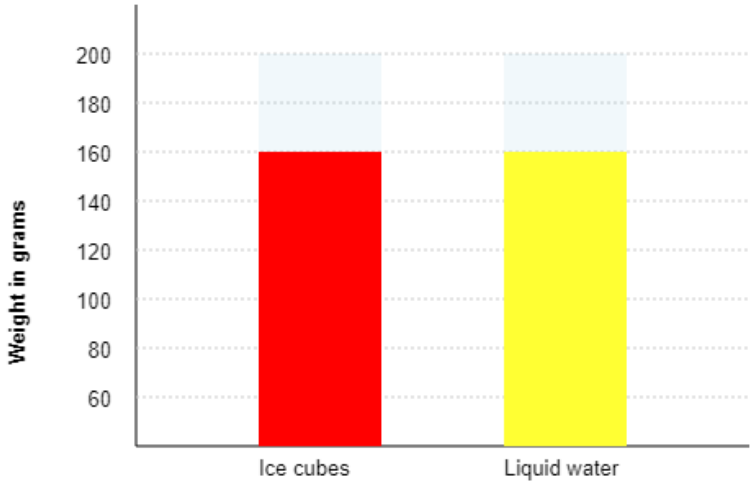



Complete the bar graph to show the weight of the ice cubes and the weight of the liquid water.



**Key:** The weight of the ice cubes and the weight of the liquid water is 160 grams. (1 point)

**Exemplar:**

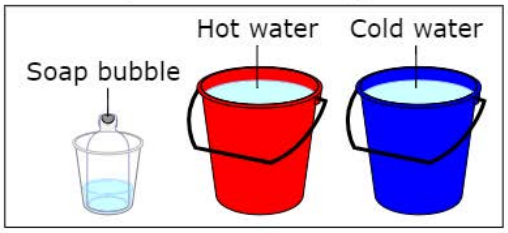


| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 3 | 5 | 5-PS1-1 | 2. Developing and using models | PS1.A Structure and Properties of Matter | 3 Scale, proportion, and quantity | 2 |

**ILCS:** Use a bubble model to describe that the particles in matter move closer together or spread apart depending on temperature and cause the bubble to inflate or deflate as they do so.

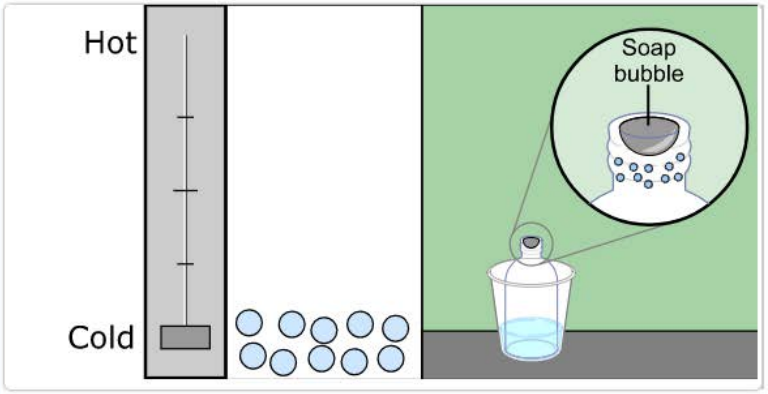
A student places a soap bubble in the opening of an empty bottle. Then the student places the bottle in two different buckets. One bucket has hot water, and the other has cold water. The student observes the changes in the soap bubble at the top of the bottle. The diagram shows the setup the student uses.

**Soap Bubble Investigation**




3

The student makes a model to show how air particles move in the bottle. The student uses blue circles to model the air particles. Drag the slider between hot or cold to watch what happens to the air particles.




Click **two** sentences that **best** describe the behavior of the air particles in the bottle.

- ☐ Cold makes the air particles move closer together so the bubble deflates.
- ☐ Heat makes air particles escape from the bottle through the bubble.
- ☐ Cold makes air particles sink to the bottom and become hard.
- ☐ Heat makes air particles move apart so the bubble inflates.

**Key:** First and fourth options (1 point)

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 4 | 5 | 5-LS2-1 | 2. Developing and using models | LS2.B Cycles of Matter and Energy Transfer in Ecosystems | 4 Systems and system models | 2 |

**ILCS:** Use a model of a fish tank to describe likely changes to the movement of matter in the fish tank when conditions in the fish tank are changed.

**Environmental Principle III:** Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

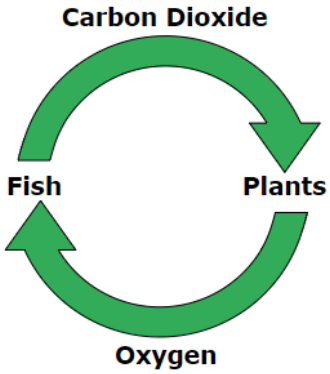
In this performance task, you will answer six questions.

Students take care of a fish tank in their classroom. The fish tank has one type of fish and one type of plant that lives underwater.

The fish and plants need each other to survive. The fish give off a gas called carbon dioxide that the plants need. The plants give off oxygen that the fish need. Oxygen and carbon dioxide are gases that have no color.

4

The diagram shows how the fish and plants interact with each other in the fish tank.




Describe what would **most likely** happen in the fish tank if the plants were removed. Enter your answer in the box provided.

**1 point**

**Exemplar:**

"If plants are gone there is no oxygen for the fish and the fish get sick or die." OR "Fish need oxygen from plants so if there are no plants fish could get hurt." OR "Plants give oxygen that fish need so if there are no plants fish don't get enough oxygen and get sick or die."

**Rubric:**

The student recognizes that if the plants are removed, the level of oxygen would decrease and put the health of the fish at risk.

**0 points**

**Exemplar:**

“Plants need carbon dioxide.” OR “Plants give off oxygen.” OR “Fish need oxygen.” OR “Fish give off carbon dioxide.”

**Rubric:**

The student attempts to answer the prompt but is incorrect.

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 5 | 5 | 5-LS2-1 | 2. Developing and using models | LS2.A Interdependent Relationships in Ecosystems | 4 Systems and system models | 2 |

**ILCS:** Use a model of a fish tank to identify likely changes to the movement of matter in the fish tank when conditions in the fish tank are changed.

**Environmental Principle III:** Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

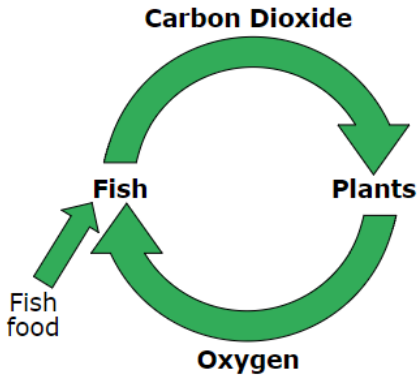
In this performance task, you will answer six questions.

Students take care of a fish tank in their classroom. The fish tank has one type of fish and one type of plant that lives underwater.

The fish and plants need each other to survive. The fish give off a gas called carbon dioxide that the plants need. The plants give off oxygen that the fish need. Oxygen and carbon dioxide are gases that have no color.

5

The students add an arrow labeled "Fish food" to the diagram.




What does adding the arrow to the diagram mean for the fish tank?

Ⓐ Plants will not need carbon dioxide from the fish.

Ⓑ Oxygen dissolved in the water provides food for the fish.

Ⓒ Fish food will end up dissolved in the water as food for the plants.

Ⓓ Fish do not get all necessary nutrients directly from the water or plants.

**Key:** D (1 point)

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 6 | 5 | 5-LS2-1 | 2. Developing and using models | LS2.B Cycles of Matter and Energy Transfer in Ecosystems | 4 Systems and system models | 2 |

**ILCS:** Use a model of a fish tank to identify likely changes to the movement of matter in the fish tank when conditions in the fish tank are changed.

**Environmental Principle III:** Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

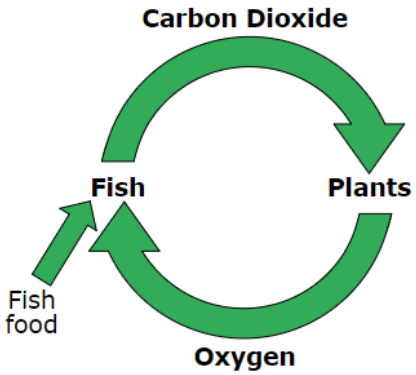
In this performance task, you will answer six questions.

Students take care of a fish tank in their classroom. The fish tank has one type of fish and one type of plant that lives underwater.

The fish and plants need each other to survive. The fish give off a gas called carbon dioxide that the plants need. The plants give off oxygen that the fish need. Oxygen and carbon dioxide are gases that have no color.

6

The students discuss what would happen in the fish tank if too much fish food is added.




Which of these is the **most likely** effect of having extra fish food left in the tank?

Ⓐ The fish in the tank will adapt to eat the extra fish food.

Ⓑ The fish in the tank will recycle the nutrients in the extra fish food.

Ⓒ Extra fish food that is uneaten will decrease the quality of the water.

Ⓓ A new type of decomposer will appear to break down the extra fish food.

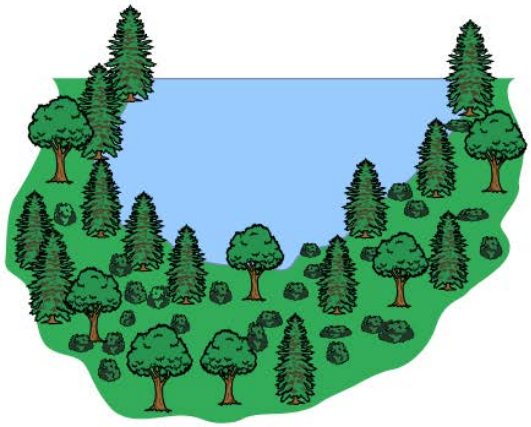
**Key:** C (1 point)

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 7 | 5 | 5-ESS3-1 | 8. Obtaining, evaluating, and communicating information | ESS3.C Human Impacts on Earth Systems | 4 Systems and system models | 2 |

**ILCS:** Evaluate sources of information on how a lake ecosystem can be affected by human activities.

**Environmental Principle II:** The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

There is a lake near the students' school. People that visit or live near the lake area can affect the living and nonliving things in the lake. The teacher asks the students to compare the fish tank to the lake.



**7**

The teacher provides two books with data about fish populations in the lake. The books are described in the table.

**Books About Fish Populations in the Lake**

| Book | How Data are Gathered | Conclusions From the Data |
|---|---|---|
| 1 | Take people on fishing tours and record how many fish are caught. | People are still able to catch fish. |
| 2 | Measure and record population size of fish and other living things in the lake for five years. | There are fewer fish living in the lake than there used to be. |

Which book contains fair data about fish populations in the lake and why?

Ⓐ Book 1, because customers paid a fee to go on a fishing tour of the lake.

Ⓑ Book 1, because people recorded how many fish can be caught during a tour.

Ⓒ Book 2, because populations of fish were tracked over a period of time.

Ⓓ Book 2, because a city paid a scientist to study fish and other living things in the lake.

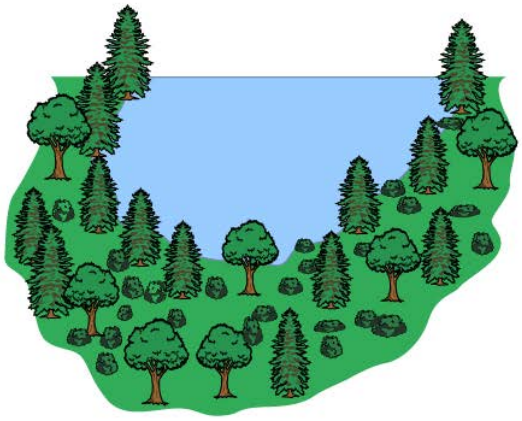
**Key:** C (1 point)

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 8 | 5 | 5-ESS3-1 | 8. Obtaining, evaluating, and communicating information | ESS3.C Human Impacts on Earth Systems | 4 Systems and system models | 2 |

**ILCS:** Use systems thinking to complete a public message on how to change human activities that affect a lake ecosystem.

**Environmental Principle II:** The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

There is a lake near the students' school. People that visit or live near the lake area can affect the living and nonliving things in the lake. The teacher asks the students to compare the fish tank to the lake.



8

A local newspaper reports that there is a lot of trash in and near the lake. This trash is mostly plastic bottles, plastic bags, and plastic wrappers. People living close to the lake say that there is more trash now than there used to be.

The teacher asks students to make posters to hang in the community. These posters should have statements about the trash in and near the lake.

Complete each statement for the students' posters.

Trash made of plastic that gets into the lake [ ▾ ].

Plants need sunlight to change matter that is not food into food. Fish need plants for oxygen.

Plants and fish need clean water to [ ▾ ].

**Key:** First drop-down menu: can harm the fish and other living things. Second drop-down menu: exchange gases with each other. (1 point)

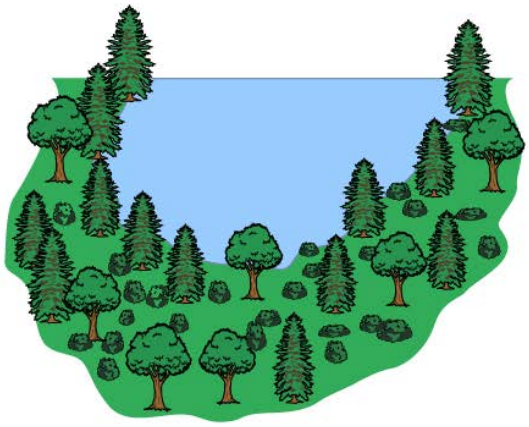
NOTE: In the stacked Spanish presentation, some stacked Spanish translation items for inline choice item types will show the entire question in Spanish, including the response options in the drop-down menus, which appear with the Spanish translation of the questions. However, other items will show the Spanish translation of the drop-down response options in italics where the drop-down list would appear in the translation; in this case, to select a response, the students will select from the English options where the English drop-down list appears.

| Item | Grade | PE | SEP | DCI | CCC | DOK |
|---|---|---|---|---|---|---|
| 9 | 5 | 5-LS2-1 | 2. Developing and using models | LS2.A.3 Interdependent Relationships in Ecosystems | 4 Systems and system models | 2 |

**ILCS:** Use systems thinking to determine a key system difference between a fish tank model of an ecosystem and an actual lake ecosystem.

**Environmental Principle II:** The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

There is a lake near the students' school. People that visit or live near the lake area can affect the living and nonliving things in the lake. The teacher asks the students to compare the fish tank to the lake.



9

The fish tank and lake are systems because the different parts work together. These two systems have different cycles of matter and energy.

Click the factors that affect each system.

| | Fish Tank System | Lake System |
|---|---|---|
| The water for the system comes from rivers and surface runoff. | ☐ | ☐ |
| The water for the system is provided by a faucet. | ☐ | ☐ |
| The temperature of the system stays about the same all the time. | ☐ | ☐ |
| The temperature of the system changes during different parts of the year. | ☐ | ☐ |

**Key:**

Fish Tank System: Second and third row

Lake System: First and fourth row (1 point)

**Exemplar:**

| | Fish Tank System | Lake System |
|---|---|---|
| The water for the system comes from rivers and surface runoff. | ☐ | ☑ |
| The water for the system is provided by a faucet. | ☑ | ☐ |
| The temperature of the system stays about the same all the time. | ☑ | ☐ |
| The temperature of the system changes during different parts of the year. | ☐ | ☑ |