A New Vision for Science Standards and Assessments

The Louisiana Student Standards for Science (LSS for Science) were created by over eighty content experts and educators with input from parents and teachers from across the state. Educators envisioned what students should know and be able to do to compete in our communities and created standards that would allow students to do so. The LSS for Science provide appropriate content for all grades or courses, maintain high expectations and create a logical connection of content across and within grades. The LSS for Science represent the knowledge and skills needed for students to successfully transition to postsecondary education and the workplace. The standards call for students to

1) apply content knowledge;
2) investigate, evaluate, and reason scientifically; and
3) connect ideas across disciplines.

This guide includes:
- Introduction to the Field Test
- Item and Set Design
- Field Test Administration Policies
- Sample Field Test Items
- Resources

INTRODUCTION TO THE FIELD TEST

Transition to New Science Assessments

Students in grades 3-8 will take a science field test only during the regular testing window, and will not take an operational science test in Spring 2018. New full-length science assessments will be developed from successful field-tested items. This will allow the Department to end the multi-grade assessments in grades 4 and 8, and align the assessment in all tested grades to the LSS for Science.

Key Goals for New Science Assessments

Starting in the 2018-2019 school year, students in grades 3-8 will take the new LEAP 2025 science assessments, which provide

- questions that have been reviewed by Louisiana educators to ensure their alignment to the Louisiana Student Standards for Science (LSS for Science) and appropriateness for Louisiana students;
- measurement of the full range of student performance, including that of high- and low-performing students; and
- information for educators and parents about student readiness in science and whether students are “on track” for college and careers.
ITEM AND SET DESIGN

Supporting Key Shifts in Science Instruction

The spring 2018 field test is designed to produce questions for a spring 2019 operational test that will assess a student’s understanding of the grade 5 LSS for Science reflecting, the multiple dimensions of the standards.

Shift: Apply content knowledge and skills (Disciplinary Core Idea, DCI)

In the classroom, students develop skills and content knowledge reflected in the Performance Expectations (PE) and detailed in the Disciplinary Core Ideas (DCI), the key ideas in science that have broad importance within or across multiple science or engineering disciplines. However, simply having content knowledge and scientific skills are not enough. Students must investigate and apply content knowledge to scientific phenomena. Phenomena are real world observations that can be explained through scientific knowledge and reasoning (e.g., water droplets form on the outside of a water glass, plants tend to grow toward their light source, different layers of rock can be seen on the side of the road).

On the field test, students answer questions aligned to PE bundles (groupings of like PEs) and the corresponding DCIs. The students begin each set of questions by reading through stimulus materials connected to a scientific phenomenon.

Shift: Investigate, evaluate, and reason scientifically (Science and Engineering Practice, SEP)

In the classroom, students do more than learn about science; they “do” science. Science instruction must integrate the practices, or behaviors, of scientists and engineers (Science and Engineering Practices; SEPs) as students investigate real-world phenomena and design solutions to problems.

On the field test, students do more than answer recall questions about science; they apply the practices, or behaviors, of scientists and engineers as students investigate each real-world phenomenon and design solutions to problems.

Shift: Connect ideas across disciplines (Crosscutting Concept, CCC)

In the classroom, students develop a coherent and scientifically-based view of the world, they must make connections across the domains of science (life science, physical science, earth and space science, environmental science, and engineering, technology, and applications of science). These connections are identified as crosscutting concepts (CCC). The crosscutting concepts have applications across all domains.

On the field test, sets of questions assess student application of knowledge across the domains of science for a comprehensive picture of student readiness for their next grade or course in science.

Set-Based Design

The field tests include item sets, task sets, and discrete items. A scientific phenomenon provides the focus for the sets. Stimulus materials, related to the scientific phenomenon, provide context for and anchor both item sets and task sets comprised of four to five questions. In addition to the information presented in the stimulus materials, the questions require students to bring in content knowledge from the course to demonstrate their understanding of science. The questions include selected-response (multiple-choice and/or multiple-select), technology-enhanced, and two-part questions. Some item sets culminate with a short constructed-response item, and the task set culminates in an extended-response item. Each field test includes a few discrete items made of selected-response, technology-enhanced, and two-part questions.
The Phenomenon and Stimulus Materials
A variety of stimulus materials provide context for each described phenomenon. Art is used to help convey information in a simplified form, examples include maps, charts, data tables, bar or line graphs, diagrams, pictures, photographs, or artist’s renderings.

Item Types
- Selected Response (SR): includes traditional multiple-choice (MC) questions with four answer options and only one correct answer, as well as multiple-select (MS) questions with five or six answer options and more than one correct answer. For MS items, the question identifies the number of correct answers. All SR items are worth one point each.
- Technology Enhanced (TE): uses technology to capture student comprehension in authentic ways, previously difficult to score by machine for large-scale assessments. TE items are worth up to two points and may include item types such as, but not limited to, drag and drop, dropdown menus, and hot spots. The Online Tools Training allows students to experience TE items and practice answering them to prepare for the computer-based test.
- Two-part Item: requires students to answer two related questions, worth two points. Two-part items may combine SR and/or TE item types.
  - Two-part Dependent (TPD): the first part must be correct in order to earn credit for the second part.
  - Two-part Independent (TPI): each part is scored independently.
- Constructed Response (CR): requires a brief response provided by the student and will be scored using a 2-point rubric. These items may require a brief paragraph, a few sentences, and/or completion of a chart.
- Extended Response (ER): asks students to write an in-depth response that expresses the students’ ability to apply all three dimensions of the LSS for Science and will be scored using a 9-point rubric.

Field Test Design
The following table identifies the design of the field tests to be administered in grade 5.

<table>
<thead>
<tr>
<th>Session</th>
<th>Component</th>
<th>Numbers and Types of Questions</th>
<th>Time Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Item Set</td>
<td>4 Items (SR, TE, and/or Two Part)</td>
<td>60 Minutes</td>
</tr>
<tr>
<td></td>
<td>Item Set</td>
<td>4 Items (SR, TE, and/or Two Part), 1 CR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discrete</td>
<td>3 Items (SR, TE, and/or Two Part)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Task Set</td>
<td>4 Items (SR, TE, and/or Two Part), 1 ER</td>
<td>55 Minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Field Test Form</td>
<td>15 SR, TE, and/or Two Part, 1 CR, 1 ER</td>
<td>115 Minutes</td>
</tr>
</tbody>
</table>

NOTE: The spring 2019 operational assessment design will differ from the field test design, as it will be a full-length assessment.

All LEAP 2025 assessments, including the science field test, are timed. No additional time is permitted, except for students who have a documented extended time accommodation (e.g., an IEP).
FIELD TEST ADMINISTRATION POLICIES

Students in grades 5 through 8 must take the field test online. The computer-based testing window opens April 9, 2018 and runs through May 4, 2018. For more information about the scheduling of the field test and online administration policies, refer to the CBT Guidance document, found in the LDOE assessment library.

Computer-Based Tests

Students will enter their answers into the online testing system. When composing their written responses for science constructed- or extended-response item, students will type their responses into an answer box, like the one shown.

The toolbar at the top of the response box allows students to undo or redo and action; and add boldface, italics, or underlining to their response. There is a limit to the amount of characters that can be typed into the response box; however, it is set well beyond what a student might produce given the LEAP 2025 expectations for written responses and timing. The character count is not included on the response box so students focus on the quality of their responses rather than the amount of writing.

The computer-based tests include the following online tools, which allow a student to select answer choices, “mark” items, eliminate answer options, take notes, enlarge the item, and guide the reading of a text or an item line by line (similar to what a student can do on the paper-based tests). A help tool is also featured to assist students as they use the online system.

- Pointer tool
- Sticky Note tool
- Line Guide
- Highlighter tool
- Magnifying tool
- Help Tool
- Cross-Off tool

All students taking the computer-based field test should work through the Online Tools Training available through INSIGHT in Winter 2017-2018 to practice using the online tools so students are well prepared to navigate the online testing system.

Testing Materials

All students should receive scratch paper and two pencils from their test administrator.
SAMPLE FIELD TEST ITEMS

This section includes sample field test items. With each item, item set, and task set, is a table containing alignment information and the answer key, where possible. Additionally, analyses of the multi-dimensional alignment for the item set and the task set are included. Rubrics for CRs and ERs are included with the items.

DISCRETE ITEMS

<table>
<thead>
<tr>
<th>Item Type</th>
<th>PE</th>
<th>DCI</th>
<th>SEP</th>
<th>CCC</th>
<th>Points</th>
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<tbody>
<tr>
<td>TEI</td>
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<td>C/E</td>
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<td>2</td>
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<td>UE.PS3D.b;</td>
<td>2. MOD</td>
<td>E/M</td>
<td>2</td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPD</td>
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<td>UE.ESS1B.a</td>
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<td>2</td>
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<tr>
<td>MC</td>
<td>5-ESS2-2</td>
<td>UE.ESS2C.a</td>
<td>5. MCT</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

SEP = blue; DCI = orange; CCC = green  An asterisk (*) denotes correct answer(s).
Technology-Enhanced Item

Performance Expectation

5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

A student conducted two trials with glasses of milk during an experiment. In Trial 1, the student added water to a glass of milk. In Trial 2, the student added vinegar to the other glass of milk. The student’s observations are shown in the table.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Liquid Mixed with Milk</th>
<th>Observation of Milk Before Mixing</th>
<th>Observation of Milk After Mixing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>water</td>
<td>smooth white liquid</td>
<td>Smooth white liquid. Milk is thinner than it was before.</td>
</tr>
<tr>
<td>2</td>
<td>vinegar</td>
<td>smooth white liquid</td>
<td>White liquid with white solid parts. Milk is thicker than it was before.</td>
</tr>
</tbody>
</table>

Multi-Dimensional Alignment

The item requires the student to apply knowledge that when two or more different substances are mixed, a new substance with different properties may be formed to demonstrate an understanding of cause and effect relationships.

Scoring Information

In Trial 1, adding water to milk causes

- the milk is thinner than it was before

The best evidence for this is that

- the glass weighs more than it did before
- the milk is thinner than it was before
- two liquids have been mixed together
- the milk is a different color than it was before

In Trial 2, adding vinegar to milk causes

- a chemical change

The best evidence for this is that

- the milk is still white
- the milk has solid parts in it
- the milk was mixed with a different liquid
- there is a greater volume of liquid in the glass than there was before
Technology-Enhanced Item

Performance Expectation

5-PS3-1 Use models to describe that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

The figure shows a food chain for a forest ecosystem.

**Food Chain for a Forest Ecosystem**

- Longleaf pine
- Cockroach
- Woodpecker

Drag the correct statement into each box to show how energy is transferred from the pine trees to the woodpecker. Not all statements will be used.

Multi-Dimensional Alignment

The item requires the student to apply the science practice of **developing and using models** and knowledge that **energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water)** to demonstrate an understanding that **energy can be transferred in various ways**.
The pine tree gets energy from dead and decaying cockroaches.

The cockroach gets energy from standing on the warm bark of the pine tree.

The woodpecker gets energy from pecking on the pine tree.

The pine tree gets energy from the Sun and gets nutrients from the environment.

The cockroach gets energy from eating the decaying wood of pine trees.

The woodpecker gets energy from eating cockroaches.
Two-Part Dependent Item (Part A: Technology Enhanced, Part B: Multiple Choice)

Performance Expectation

5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

While looking at the sky at around 9 P.M. one night in January, a group of friends identified four constellations: Leo, Ursa Minor, Pegasus, and Orion. They researched the locations of each constellation in the night sky in April, July, and October. The figure shows their findings.
Multi-Dimensional Alignment
The item requires the student to apply the science practice of **analyzing and interpreting data** and knowledge of how **the orbit of Earth around the Sun and the rotation of Earth about the axis between its North and South poles cause observable changes** to demonstrate an understanding of **patterns**.

**Part A**
Which constellations would **most likely** be visible in December?
Select the **two** correct answers.

**Part B**
Which evidence from the figure best supports the answer to Part A?
A. The constellations appear to move south to north.
B. The stars appear to rotate around a fixed point in the northern sky.*
C. The constellations appear to move from west to east across the sky.
D. Some stars appear to stay in the south, while others stay in the north.
Multiple-Choice Item
Performance Expectation
5-ESS2-2 Describe and graph the amounts and percentages of water and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.

Which statement best describes the distribution of water on Earth?
A. Most of Earth’s water is stored in the oceans.*
B. Most of Earth’s water is frozen in the polar ice caps.
C. Most of Earth’s water is flowing in streams and rivers.
D. Most of Earth’s water is trapped in underground aquifers.

Multi-Dimensional Alignment
While effectively applying the science practice of using mathematics and computational thinking by describing the graph quantities to address water distribution, the student demonstrates knowledge that nearly all of Earth’s available water is in the oceans.
ITEM SET: Cordgrass Ecosystem

Performance Expectations

5-LS1-1 Ask questions about how air and water affect the growth of plants.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

<table>
<thead>
<tr>
<th>Item Type</th>
<th>PE</th>
<th>DCI</th>
<th>SEP</th>
<th>CCC</th>
<th>Points</th>
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<td>UE.LS1C.b</td>
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<td>CR</td>
<td>5-LS2-1</td>
<td>UE.LS2B.a</td>
<td>2. MOD</td>
<td>SYS</td>
<td>2</td>
</tr>
</tbody>
</table>

SEP = blue; DCI = orange; CCC = green  An (*) denotes correct answer(s).
Stimulus Materials

Use the information about cordgrass and your knowledge of science to answer the questions.

Cordgrass

A student reads the following information about smooth cordgrass in a science magazine.

- It is one of the few plants that grow in the tidal zone of saltwater marshes.
- It can grow to heights ranging from 6 inches to 7 feet tall.

Figure 1 shows a cross section that compares cordgrass heights in the tidal zone of a saltwater marsh. The tidal zone moves water around. This removes some of the dangerous substances that can keep plants from growing.

Figure 2 shows a food web in a saltwater marsh that contains cordgrass.
A herring gull dies in the saltwater marsh.

Drag the statements into the correct order to model how the matter from the dead herring gull is moved in a saltwater marsh.

```
The blue crab eats the sheepshead minnow.
The grass shrimp eats the decaying matter.
The sheepshead minnow eats the grass shrimp.
Matter in the herring gull decays.
```

**Technology-Enhanced Item**

**Multi-Dimensional Alignment**

While effectively applying the science practice of **developing and using models** by **developing a model to show how matter moves in an ecosystem**, the student demonstrates knowledge that **matter cycles between the air and soil and among plants, animals, decomposers, and microbes as organisms live and die.**

**Scoring Information**
Two-Part Dependent Item (Part A: Technology Enhanced, Part B: Multiple Choice)

Part A
Nutria are non-native aquatic rodents that eat smooth cordgrass. Nutria can quickly disrupt a saltwater marsh ecosystem.

Select the organism whose population would most likely decrease first if nutria were to move into the saltwater marsh ecosystem.

Part B
Which statement best supports the answer to Part A?
A. Because the nutria eat the cordgrass, the diamondback terrapin has fewer plants to eat.
B. Because the nutria eat the cordgrass, the periwinkle has less of its main food source available.*
C. Because the otters lose the ability to hide in the cordgrass, their predators are more likely to prey on them.
D. Because the cordgrass provides less shade, the sheepshead minnows are easier for the herring gulls to see and catch.

Multi-Dimensional Alignment
While effectively applying the science practice of developing and using models by using a model to show ecosystem interactions, the student demonstrates knowledge of how newly introduced species can damage the balance of an ecosystem.
Scoring Information for Part A

- blue crab
- diamondback terrapin
- otter
- herring gull
- periwinkle
- grass shrimp
- sheepshead minnow
Two-Part Dependent Item (Part A: Multiple Choice, Part B: Technology Enhanced)

Part A
A student wants to know the ideal conditions for smooth cordgrass growth. Based on the information in Figure 1, which question is best for the student to investigate?
A. Does cordgrass need a certain type of soil to grow taller?
B. Does cordgrass need to have its seeds spread by a certain animal?
C. Does cordgrass need to have a certain depth of water to grow leaves?
D. Does cordgrass need a certain amount of salt in the water it grows in?*

Part B
Select the correct answer from each dropdown menu to complete each sentence.
A student predicted that when the smooth cordgrass is planted in the berm, it will be

\[
\begin{align*}
\text{taller than} & \quad \text{shorter than} & \quad \text{the same height as} \\
\end{align*}
\]

compared to the high marsh, the berm 

\[
\begin{align*}
\text{has less soil} & \quad \text{has more salt in the water} & \quad \text{gets the same amount of sun} & \quad \text{has fewer plant-eating species} \\
\end{align*}
\]

Multi-Dimensional Alignment
While effectively applying the science practice of asking questions and defining problems by asking questions that can be investigated and predicting outcomes based on cause and effect relationships, the student demonstrates knowledge of how plants acquire their material for growth chiefly from air and water.

Scoring Information for Part B
A student predicted that when the smooth cordgrass is planted in the berm, it will be
taller than cordgrass planted in the high marsh. This is because compared to the high marsh, the berm has more salt in the water.
A student developed the food web model shown.

Describe how the movement of matter in this food web would change if insects disappeared. Be sure to include the various consumer levels in your description.
Multi-Dimensional Alignment
The item requires the student to apply the science practice of **developing and using models** and knowledge of how matter cycles between the air and soil and among plants, animals, decomposers, and microbes as organisms live and die to demonstrate an understanding of systems and system models.

Scoring Guide

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student correctly describes how the movement of matter in the ecosystem would change AND how the populations of different consumer organisms would change as a result.</td>
</tr>
<tr>
<td>1</td>
<td>Student correctly describes how the movement of matter in the ecosystem would change, but does not describe how the populations of different consumer organisms would change as a result.</td>
</tr>
<tr>
<td>0</td>
<td>Student does <strong>not</strong> correctly describe how the movement of matter in the ecosystem would change or how the populations of different consumer organisms would change as a result.</td>
</tr>
</tbody>
</table>

Scoring Notes:
- Description of how the movement of matter in the ecosystem would change (1 point)
- Description of how the populations of different consumer organisms would change as a result (1 point)

Examples include:
- Consumer organisms eat other organisms to get matter. If there were no insects, matter from algae could not move to other organisms in the ecosystem. This means that some of the consumer organisms would not be able to get enough matter to survive. There would be no frogs, fewer fish, fewer turtles, and fewer alligators in the ecosystem.
- If the insects disappear, matter will not move from algae to insects, then to fish and frogs. Frogs will not be able to survive because they cannot get matter from insects. There will also be fewer fish because they cannot get matter from insects. Because there are fewer fish, there will be fewer turtles. Because there are no frogs and fewer fish and turtles, there will be fewer alligators.

Accept other reasonable answers.
**TASK SET:** Landslides

**Performance Expectations**

5-PS2-1 Support an argument that the gravitational force exerted by Earth is directed down.

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

<table>
<thead>
<tr>
<th>Item Type</th>
<th>PE</th>
<th>DCI</th>
<th>SEP</th>
<th>CCC</th>
<th>Points</th>
</tr>
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<tbody>
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<td>MS</td>
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<tr>
<td>TE</td>
<td>5-ESS2-1</td>
<td>UE.ESS2A.b</td>
<td>2. MOD</td>
<td></td>
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</tr>
<tr>
<td>ER</td>
<td>5-ESS2-1; 5-PS2-1</td>
<td>UE.ESS2A.b; UE.PS2B.c</td>
<td>7. ARG</td>
<td>SYS</td>
<td>9</td>
</tr>
</tbody>
</table>

**SEP = blue; DCI = orange; CCC = green** An asterisk (*) denotes correct answer(s).

**Stimulus Materials**

Use the information about landslides and your knowledge of science to answer the questions.

**Landslides**

Big Sur, California, is located right next to the Pacific Ocean. The area of Big Sur has many steep cliffs and slopes. Major landslides happened there in 1998, 2000, and 2017. Landslides take place when rocks and soil move downward. Roads can be covered with rock, and parts of a road can fall into the ocean. People cannot drive through the area until soil and rocks are removed or the road is replaced. Landslides are less likely to happen on stable slopes. On stable slopes, the upper layers of rock are connected to and supported by the bottom layers of rock, as shown in Figure 1. Slopes become unstable when layers of rock become separated from one another. This can happen when water fills the cracks between rocks.
A student claims that landslides are caused by the downward force of gravity. Which statements provide evidence to support the student’s claim?

Select the two correct answers.
A. Big Sur has very steep cliffs.
B. Falling rocks can cover a road.*
C. Rocks and soil can block traffic.
D. Rock layers push against each other.
E. Parts of a road may fall into the ocean.*

Mal-Dimensional Alignment
While effectively applying the science practice of engaging in arguments from evidence by supporting an argument with evidence of gravity, the student demonstrates knowledge of that the gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center.
A hiker kicks the loose rock and observes that, two minutes later, the rock has rolled to the bottom of the slope. Which statement best explains the hiker’s observations?

A. Gravity pulled the rock downward only when the rock bounced over objects on the slope.

B. Gravity pulled the rock straight down the entire time, which caused the rock to move downward.*

C. Gravity pulled the rock at an angle along the ground some of the time to cause the rock to move on the slope.

D. Gravity pulled the rock in different directions at certain times, which caused the rock to move downward without getting stuck in the grass.

Multi-Dimensional Alignment
The item requires the student to apply knowledge that the gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center to demonstrate an understanding of cause and effect relationships.
Technology-Enhanced Item

Select the correct answer from **each** dropdown menu to complete each sentence.

A landslide can happen when a slope becomes unstable. One way the slope can become unstable is if
cause the rocks and soil that make up the

![Dropdown menu options: biosphere, geosphere, atmosphere, hydrosphere]

...to become loose and easy to move. Another way the slope can become unstable is if heavy rainfall or freezing ice pushes rocks and soil apart. This
shows an interaction between parts of the

![Dropdown menu options: biosphere and geosphere, atmosphere and geosphere, biosphere and hydrosphere, atmosphere and hydrosphere]

Multi-Dimensional Alignment

The item requires the student to apply knowledge that **Earth’s systems (geosphere, hydrosphere, biosphere, atmosphere) interact in multiple ways to affect Earth’s surface materials and processes** to demonstrate an understanding of **systems and system models**.

Scoring Information

A landslide can happen when a slope becomes unstable. One way the slope can become unstable is if
burrowing animals in the biosphere cause the rocks and soil that make up the geosphere to become loose and easy to move. Another way the slope can become unstable is if heavy rainfall or freezing ice pushes rocks and soil apart. This shows an interaction between parts of the biosphere and hydrosphere.
Multi-Dimensional Alignment
While effectively applying the science practice of developing and using models by developing a model to describe how Earth’s systems interact, the student demonstrates knowledge that Earth’s systems (geosphere, hydrosphere, biosphere, and atmosphere) interact in multiple ways to affect Earth’s surface materials and processes.
A community along Big Sur suggests that planting trees and bushes on steep slopes can help prevent landslides. Use evidence from Figure 1 to construct an argument about whether this method will help prevent landslides. Include a prediction about how planting trees and bushes will change the interactions between the geosphere and the atmosphere, the biosphere, and the hydrosphere.

As you respond to the prompt, be sure to:

- Address all of the instructions.
- Use evidence from the information provided and your own knowledge of science to support your response.
Multi-Dimensional Alignment
The item requires the student to apply the science practice of engaging in an argument from evidence and knowledge of how:

- Earth’s systems (geosphere, hydrosphere, biosphere, and atmosphere) interact in multiple ways to affect Earth’s surface materials and processes, and
- the gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center to demonstrate an understanding of systems and systems models.

Score Points
- The student’s score is the total of the points earned across all parts (up to an item maximum of 9 points).
- No response (blank) or a response that does not address the prompt earns 0 points.
- 2 points for each prediction (for a total of THREE predictions):
  - Score 2 points: Correct prediction with a description of the specific system interactions involved.
  - OR
  - Score 1 point: Correct prediction, but the specific system interactions are not described.
- 3 points for constructing an argument:
  - Score 3 points: Argument is constructed for the correct claim, includes a description of the interactions of components of the systems, and includes evidence.
  - OR
  - Score 2 points: Argument is constructed for the correct claim and includes a description of the interactions of components of the systems.

Score Information
1. **Biosphere and geosphere:** The roots of bushes and trees will hold together soil and rock layers. This is an interaction between the biosphere (roots of bushes and trees) and the geosphere (soil and rock layers).
2. **Atmosphere and geosphere:** Because the soil is held together more tightly, wind will cause less erosion of the soil than before. This is an interaction between the atmosphere (wind) and the geosphere (soil).
3. **Hydrosphere and geosphere:** Because the soil and rock layers are held together more tightly, rain cannot soak into the soil and separate the rock layers, and running water cannot wash away the soil. These are interactions between the hydrosphere (rain and running water) and the geosphere (soil and rock layers).
4. **Argument about proposed solution:** Planting trees and bushes will prevent landslides. Landslides occur on slopes that are not stable. Plant roots prevent soil erosion that would be caused by wind and running water. Plant roots also prevent rain from separating the rock layers. Because there is less erosion and the rock layers are held together, the slope will be stable and a landslide will not occur.

NOTE: Also accept answers explaining that roots prevent rain from separating the rock layers.
RESOURCES

- **K-12 Louisiana Student Standards for Science (2017)**: provides the performance expectations and three-dimensional learning for all grades
- **Science Standards - Shifts In Science**: supports teachers in understanding how the three-dimensional learning impacts instruction
  - **Appendix A - Learning Progressions**: describes the development of SEPs, DCIs, and CCCs as appropriate for grade spans across K-2, 3-5, middle school, and high school
  - **Appendix B - Connections to ELA and Math K-12**: details the connections between the Louisiana Student Standards for Science and the Louisiana Student Standards for Math and ELA
- **Grade 5 Sample Scope and Sequence**: includes sample units to assist educators in transitioning to the new science standards.
- **Grade 5 Science Library**: contains resources and supporting instructional material, including sample tasks
- **Online Tools Training (OTT)**: provides students and teachers opportunities to become familiar with the tools available in the online testing platform; currently available in INSIGHT or here using the Chrome browser
- **LEAP Accessibility and Accommodations Manual**: provides information about Louisiana’s accessibility features and accommodations for testing
- **LEAP 2025 Technology Enhanced Item Types**: provides a summary chart of technology enhanced items students may encounter in any of the computer-based tests across courses and grade-levels
- **2017-2018 Louisiana Assessment Calendar**: includes information on testing windows for test administrations